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New Ideas in Industrial Organization

Factory Solidarity as Opposed to Class Solidarity—
Spirit More Important than Form—Highly Important
Changes May Come in Solving the Labor Problem

BY WALTER GORDON MERRITT

THE war has wrought many changes in industry and, if discussion and agitation are an aid to the cure of human ills, it has benefited mankind by parading every plan for the reconstruction of industry. No "ism" need search in vain for many friends and many foes; none suffers from the insolence of indifference or the contumacy of neglect, but each is supported by ardent proponents who inevitably arouse equally ardent opponents.

The ancient idea of organization among the workers has not only been galvanized into new action but, under the guidance of the National War Labor Board and through a broader recognition by the employers of the necessity for group co-operation and group responsibility, has veered in a new direction. Employers' associations are to-day investigating the possibilities of the new idea of organization which they opposed a year ago because they now understand how it is differentiated from militant unionism. Before the war, our conception of labor organizations was largely limited to the familiar type of labor union which, through the absorption of rival unions, in most cases left the trade unions affiliated with the American Federation of Labor in substantial control of all organized workers in their respective industries. The unorganized workman was forced to join the old type of union regardless of whether he approved of its policies, politics or economics, or must remain in a comparatively helpless and inarticulate status. Rival organizations were vigorously suppressed by the estab-

lished organizations and the Federation which jealously sought to protect their control and monopoly.

According to the closed-shop tenets of these familiar organizations, no man could work in union factories or in any organized trade unless by agreement between him and the union he became a union member, and some unions restricted membership and apprentices in order to limit the supply of labor. These organizations represented about a fifth of what may be called the organizable labor of the country, while the remaining four-fifths had no medium for group expression or group service on matters relating to their interests, the interests of their employers, or the interests of government and society.

Now a new type of intra-factory organization of employees, known as the shop committee works council, or factory representation, comes upon the scene. This movement, highly experimental in character, the extension of which is partly due to the mismanagement and mischief of some of the old-time organizations, is already assuming substantial proportions. It recognizes the right of everyone employed to participate in the adjustment of labor questions through elected representatives from the different departments of the individual factory, and does not limit employment to those who join a particular trade guild. It concedes the necessity for labor organization in large factories in order to supplement individual responsibility with group responsibility and group service, but does not concede the necessity

The World's Greatest Problem

Labor problems demand the attention of the world to-day. Many other questions affect parts of the world vitally, but nothing is of such world-wide importance as the adjustment of relations between employers and employees. No matter how much material wealth it may have, or power in other ways, the United States will fail ignominiously as the leader of nations unless it leads them in establishing harmony between capital and labor.

Now is the time for clear thinking, for discussion in the spirit of reasonableness, and for action of the most broad-minded character to promote the common welfare.

Walter Gordon Merritt, the author of this article, is a New York lawyer who has long been identified with industrial problems. He has fought and fought hard, but he sees clearly that peace between capital and labor cannot be permanent and the best interests of both the employers and the employees be promoted unless the rights of all are considered. In this article, and in two that are to follow, he will do some very plain talking about both employers and employees. Many of our readers will disagree with him, perhaps, on some points, but he will make an able presentation of the questions as he sees them, showing the dangers of conservatism as well as the perils of radicalism. He will point the way to what he believes is the means of bringing about just relations in the industrial world. THE IRON AGE commends the articles to the thoughtful consideration of its readers and invites discussion upon them.

for outside intervention from the militant and anti-social type of organization. Ordinarily it operates independently of the established unions, but it does not necessarily involve opposition to them. It seeks co-operation and team play as between each employee and his fellow employees, as well as between employer and employees, as against the régime of excessive individualism where each employee is for himself, and it meets the need for group machinery to attain this end. In building operations, it has little or no application.

Spirit, Not Form, Is Important

The particular form of factory organization is not so important as the spirit behind it. It involves the election of some kind of committee or representatives of employees who can co-operate with the management and co-employees and undertake whatever measure of self-government devolves upon them. The methods of election must be above suspicion. Every opportunity for undue influence, unfairness or corruption must be closed and real independence of ballot maintained. But all these details have been carefully worked out. The plan may take high-sounding names, as in some plants which provide for a Congress elected by the employees, a Senate of foremen, and a Cabinet of chief executives; or it may be the more modest arrangement approved by the War Labor Board, where elected representatives of the employees of each department constitute a departmental committee to confer with the management on departmental labor problems. Under this less pretentious plan, all of the representatives of the different departments usually constitute a general conference committee to meet with the management for the discussion of labor questions affecting the entire plant, and for hearing appeals on matters which are not settled in the respective departments. Matters of factory administration to carry out labor policies reached by joint discussion remain with the management. Significant in theory, if not important in practice, is the veto power usually reserved by the management, but this does not impair the satisfaction created by the joint discussion of labor conditions as compared with the superseded system of *ex parte* judgment. It is believed by many that the factory organization furnishes the best conduit through which ideas of the management may permeate the employees and the ideas of the employees may reach the management. It removes barriers to understanding which are the prolific source of conflicts, international and interclass. It provides machinery for co-operation between employees and co-employees as well as between management and employees, and thereby lays the foundation for true factory unity and associated effort. Where this machinery is lacking the circuit is broken.

Profound Changes May Follow

If this new plan for collective functioning succeeds, it carries with it possibilities as yet speculative which may make profound changes in the private and public aspects of the labor problem. "We stand today," it is said, "at one of those definite turning points in human history, where a generation of men has it in its power by the exercise of faith and wisdom, by facing the problems of the moment without passion and without shrinking, to determine the course of the future for many years." Perhaps an important adjustment is about to take place between the independent factory organization, where collective dealings are frankly and sincerely encouraged, and the old-time national trade unions which subordinate production and factory management to the interests of class war and

restrict autonomous adjustment of labor relations in the individual concern. A wholesome rivalry between two different types of labor organizations, in factories where jurisdictional disputes are not likely to arise, may have a beneficial effect on both and may save the country from the dangers which necessarily arise where any industry or utility is wholly under the domination of one uncontrollable organization.

Beginnings of Intra-Factory Organization

The beginnings of the independent, intra-factory organization in this country are significant. The protocol in the clothing trades was distinctly a union arrangement which largely observed the sound principles of the works organization, but the earliest independent movement of any renown was born of the terrific struggle between the United Mine Workers and the Colorado Fuel & Iron Co. in 1915. Mr. Rockefeller fearlessly opposed the tyrannies of the closed shop and the methods of the Mine Workers' Union and with the help of MacKenzie King inaugurated an elaborate plan for industrial representation in the Colorado properties, which was later declared by the Federal Commission on Industrial Relations to be a "new departure in the United States." It was the first important effort in this country to organize the employees of a single company into a kind of representative government with which the management could deal independently of any outside union, and it, of course, met with great opposition and ridicule both from the United Mine Workers and the American Federation of Labor.

This hostile attitude is significant, for it was not due entirely to the state of intense industrial warfare, amounting almost to civil war, which existed between these interests at the time the Plan was installed. The Federation of Labor, blinded by self-satisfaction, called the Colorado Plan "a pseudo union" and utterly failed to see in its formation a natural consequence of some of its mistakes. "If unions are a good thing," says the *Federationist*, "increasing in desirability with their democracy, why cannot Mr. Rockefeller approve of unions of the miners, for the miners and by the miners—that is, the United Mine Workers of America?" The question implies what is untrue, but the answer is not so difficult as the federation suggests, and it lies in the fundamental distinction between the ideals of the old unionism and new type of collective action. If the old type of organization had proved more democratic and more responsible and had devoted any considerable attention to the problems of factory management and the needs of efficiency and co-operation, there would have been less provocation for the new.

Slow Growth Until the War

The Colorado Plan met with few imitators in the succeeding two years, due undoubtedly to the conservatism and prejudice of employers. Management does not care to experiment with other people's money. Further progress required the urge which the war has given to a bolder examination of social and industrial questions; a better appreciation of the possibilities and dangers of a proletariat dictatorship, and an actual demonstration that the pitfalls of conservatism are as real as the pitfalls of experiment. Above all, it required the recommendations of the Whitley Committee and the suggestive value of English experience, as well as the great wave of humanism which is sweeping over the world. Employers in the United States are now coming to feel that some method must be devised to secure for the workers a more effective voice

in the conditions of their service, but that this method must not be the absentee control or the antagonistic attitude of some unions. Certain unions which have shown intelligent leadership have been, and still will be, able to do business with employers, but others which have fallen prey to the evils of bossism, which have broken contracts and have been guilty of arbitrariness and overreaching, have lost the substantial recognition which they once received. They have not properly distinguished between the fair and unfair employer and have taken advantage of those who were the most liberal. In many cases they have been tried and found wanting. Out of all this has grown the movement for the new type of shop organization which in the last year has multiplied the number of such plans actually put in operation. Some of our largest and most representative industries today are working under such an arrangement with a sincere belief that it is necessary and will succeed. Their prevailing thought finds admirable expression in the report of the Garton Foundation:

"Mutual hostility of employers and employed is the prime obstacle to the three essentials of industrial prosperity—increased output, increased saving, increased confidence. . . .

"It is necessary to create adequate machinery both for securing united action in the pursuit of common ends and for the equitable adjustment of points which involve competing interests."

Co-operation Through Works Organization

While our industrial conditions should not be patterned after those of Great Britain, it is nevertheless illuminating to turn to the studies carried on in that country for the discovery of general principles applicable to this subject. The foremost of these, which no one will gainsay at the present time, is the statement in the report of the Whitley Committee that "means for securing for the work people a greater share in and responsibility for, the determination and observance of the conditions under which their work is carried on," must be provided in order to secure "the better utilization of the practical knowledge and experience of the work people." This spells some measure of industrial democracy under some form of intra-factory government in which the workers shall participate, and its application may perhaps be brought about in this country, not under the direction and control of national unions, as in Great Britain, but through the initiative of individual factories with a view to greater co-operation and community of interest between the individual employer and his workers. As compared with the ordinary union, it would emphasize "home rule" and self-government in determining working conditions and would compel all of the rank and file to participate more actively instead of remaining away from organization meetings. It would permit greater regard for the varying conditions of different factories and communities and a greater flexibility in dealing with the peculiar capacity and personality of each worker as against the thoroughly discredited system which limits production and holds men down to a common level. Above all things, it will promote rather than restrict efficient production by close co-operation and common counsel.

Not a Spectre of Radicalism

One sees in this kind of industrial democracy, which provides for joint discussion of labor conditions in each factory, not the fearsome spectre of radicalism which employers are opposing, but a gradual development of responsibility and self reliance, individual and collective. Those questions which relate exclusively to the activities and sur-

roundings of the workers should to a larger extent depend on the good will and self determination of the men themselves, if the country in general and business in particular is to secure co-operation and reap those wonderful possibilities which are latent in almost every human being. It must be arranged that "the elemental springs of human activity shall not be damned but flow forth in normal fashion, for normal man is constructive." The largest practicable measure of individual and collective self-government and responsibility will promote this result. Where the employer awakens the self interest of employees by permitting them to share in the collective savings of the economies and efficiency they effect in any department by co-operation among themselves, he frequently finds that they become the best disciplinarians and efficiency engineers which can be produced. Former Governor Robert P. Bass of New Hampshire has recently stated this very well:

"I believe that we have emphatically come to the time when we must make it clear to the workman himself that production is his problem and that he will profit or suffer in direct degree as this problem is effectively or ineffectively handled. In order to make this possible, labor must be given its full responsibility, together with the power to act in relation to that responsibility. We must promulgate a labor policy which affirms labor's right to a substantial voice in determining the conditions under which it works and labor's corresponding responsibility."

[In his next paper Mr. Merritt will tell how, in his opinion, whole-hearted co-operation of workmen can be obtained and he will discuss collective bonuses as compared with profit sharing.]

Briquetting Coke Breeze

According to an article by Herr Kayser in a German gas journal, coke breeze requires from 9 to 10 per cent of pitch as binding material for briquetting purposes. In the "Koxit" process, part of the pitch is replaced by a cheaper fluid binder consisting of oil-gas tar and vertical-retort tar in about equal parts. The mixture of coke, pitch and binding medium is heated with superheated steam and pressed into egg-shaped briquettes. In a series of trials a satisfactory briquette was obtained by the addition of about 5 per cent pitch and from 0.8 to 1 per cent of the liquid binder. The air-dried briquettes contained about 3.5 to 4.5 per cent of water and yielded about 14 to 16 per cent ash. The calorific value was 6400 to 6000 cal. The quantity of water taken up when the briquettes were stored under water for seven to eight days ranged from 13 to 18.6 per cent, as compared with 11.9 per cent by lignite briquettes under similar conditions. The loss of weight after transport by rail, unloading, and storing for six months was, in three tests with large quantities (3 to 7 tons) 4.1 to 6.3 per cent. For preference the pitch should have a softening point between 60 and 75 deg. C. For steam-raising purposes an addition of from 20 to 25 per cent of coal dust is in general necessary to secure good combustion.

The briquettes do not crumble when burnt. The coking effect is increased by the use of liquid binders capable of acting as solvents for the pitch, such as anthracene oil, etc. Very viscous binding material is not suitable as, by its use, air is entrapped in the pores of the coke breeze and the briquette on subsequent combustion crumbles owing to the expansion of the entrapped air. A process has been patented whereby this effect is reduced by adding the liquid binder under reduced atmospheric pressure.

The total cost of manufacture, including establishment charges, cost of material and labor since the commencement of the war has amounted to about 7s. 8d. per ton. The sale price determined by the relative calorific values of the respective fuels is about 14 to 15 per cent lower than that of coke.

"HANDLE IT MECHANICALLY"

Slogan of New Association of Manufacturers— Meeting in New York

The Material Handling Machinery Manufacturers' Association, an organization which started active work about three months ago to promote the more extensive use of machinery for handling material and freight at ports, terminals and in industrial plants, held its first semi-annual meeting at the Hotel Astor, New York, on Wednesday, June 11. The association now consists of 37 active members and 13 associate members, has a paid secretary, Zenas W. Carter, with offices at 35 West Thirty-ninth Street, New York, and is conducting an active promotion campaign. Calvin Tompkins, former dock commissioner of the city of New York, who has been for many years greatly interested in port and terminal development, is president of the association, though having no connection with any company manufacturing material handling equipment.

As brought out at the meeting last week the functions of the new association have been manifested in several directions. An engineering committee has been formed which will meet with port and harbor commissions, state engineers and other officials interested in the problems of freight handling. Recently this committee held a conference with B. F. Cresson, Jr., consulting engineer of the New York and New Jersey Port and Harbor Commission, the purpose being to present to that official data regarding the application of all mechanical handling machines and equipment which might be considered suitable for and economical in the handling of all manner of freights and cargoes passing in and out of the port of Greater New York. Mr. Cresson, who recently made a trip to the Pacific Coast, stated that there is a large movement for port development in progress on the West Coast, involving expenditures of about \$4,500,000 at Los Angeles, \$8,000,000 at San Francisco, \$5,000,000 at Portland, \$2,500,000 at Seattle, \$2,500,000 at Tacoma, while Vancouver, B. C., is asking for \$5,000,000 for improvements at English Bay.

New Freight Piers

At the meeting with Mr. Cresson a resolution was adopted to be presented to the mayor of New York and officials having to do with the construction of new freight piers on Staten Island, asking that no contracts for erecting such piers be consummated until a thorough investigation has been made to determine the particular type of pier construction that is best adapted to the installation of modern cargo-handling devices and machinery. Also the attention of the New York officials was called to the necessity for the installation of mechanical handling equipment in order that the costs of handling cargoes in the port of New York may compare favorably with the costs for handling similar cargoes in the other great ports of the world.

The engineering committee of the association has also met recently with the state engineer of New York to discuss standard specifications for cranes suitable for loading and unloading freight from barges on the New York State canal. It is estimated that fully 50 or 60 cargo-handling cranes will be required at various ports on the canal.

New Steel Plant at Hoquiam, Wash.

Construction of the steel plant of the Western Rolling Mill Corporation at Hoquiam, Wash., has been started and the company is in the market for mill machinery, including cranes, open-hearth furnaces and 1200-hp. motors. The plant is being built on six and one-half acres within the limits of the city of Hoquiam. The first unit will have a daily capacity of 100 tons per day. Merchant steel bars, principally, will be manufactured. The original unit will consist of one open-hearth furnace and one continuous furnace. Later on an electric furnace will be

added. Another activity of the association is to demonstrate by means of moving pictures the economical advantages of mechanical handling equipment. The slogan of the association, "handle it mechanically," will be spread all over the world by motion pictures, and in this work the association was promised the co-operation of the Bureau of Commercial Economics of Washington by its director, Francis Holly, in showing the association's pictures in every part of the world. Paul Caldwell, New York district sales manager of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, chairman of the motion picture committee, and L. G. Harkness Smith, director of the association's motion picture productions, told of the work in this line that is now being done.

Numerous Addresses

The morning session of the convention was devoted to routine business, and in the afternoon addresses were delivered by H. B. Cleland, McGraw-Hill Publishing Co.; James H. Collins, business writer for the *Saturday Evening Post*; Francis Holly, director of the Bureau of Commercial Economics, Washington; David B. Rushmore, General Electric Co.; H. M. Miller, Loudon Machinery Co., and J. F. Thornton, Equipment Mfg. Co., all dealing with the opportunities which are open to the association in promoting the more extensive use of machinery for handling material and freight cargoes.

An evening meeting was held at the Hotel Astor, when former United States Senator Theodore Burton, now chairman of the board of the Merchants' National Bank, New York, was the principal speaker. Calvin Tompkins, president of the association, who presided, told of the great need for better facilities for loading and unloading cargoes at New York and other ports. Senator Burton pointed out the help that the association might give in reducing the high cost of living by more economical handling of freight, and he said further that the success of the new American merchant marine was largely dependent on the savings that might be effected at ports by more rapid and less costly loading and unloading of ships.

Roy S. McElwee, assistant director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, author of "Ports and Terminal Facilities," gave a technical description of the best American and European wharf equipment now in use. This was illustrated by stereopticon slides.

Discussion of the attitude of labor toward the association's program of substituting machinery for man-handling of freight developed at several points in the association's proceedings. It was the opinion of several speakers that labor's possible objections could be overcome if labor organizations were dealt with frankly in the matter. It was stated that all important substitutions of machinery for men in the past had worked out eventually for the employment of larger numbers of men. The printing industry was cited as an example, wherein the introduction of the linotype and monotype machines had stimulated printing to such an extent that more men are now employed as printers than before these labor-saving machines came into use. The association will probably invite representatives of labor organizations into some of its conferences in order that the association's work may be thoroughly understood by them.

The Western Rolling Mill Corporation has been capitalized at \$2,000,000. The first unit, now under construction, will cost \$250,000, and agreements with financial interests back of the proposition necessitate completion of the first unit and actual operation by Feb. 1, 1920. In the beginning the plant will employ approximately 100 men.

The United Supply Co., Brunswick, Ga., wholesale and retail hardware, mill supplies and machinery, is revising its catalog files, and would like catalogs from manufacturers and jobbers carrying lines which it handles.

Vital Points in the Manufacture of Files*

A Discussion of the Steels Used, Annealing, Grinding and Cutting—Correct Forms of Teeth and How Obtained

BY GEORGE TAYLOR

NEARLY all files are made to-day from either Siemens or Bessemer steels. Exceptions are such files as warding, taper, and mill saw, and other very small files. In the Sheffield district, in point of chemical composition, the steels used fall between the following limits:

	Per cent
Carbon	0.90 to 1.40
Silicon	0.10 to 0.25
Manganese	0.30 to 0.80
Sulphur	0.01 to 0.05
Phosphorus	0.02 to 0.06

Of late years, with a desire to produce a better and more durable article, manufacturers have resorted to the practice of adding special elements to file steels, chiefly chromium and tungsten. Whatever commercial advantage there may be in using these special elements in file steels, there is probably no great increase in the actual efficiency of the file, and there may be some decrease unless a number of oft-overlooked precautions are simultaneously taken.

In relation to the manufacture of files, crucible and Siemens steels are to be distinguished chiefly by the

analysis; insist on the cast number and analysis being given with each delivery of material; check the analysis; and from each delivery of material examine the extent of decarburization. In this way the examination will become a properly organized part of the file-maker's system and prevent many of the subsequent troubles he now experiences.

Forging

Some files, principally very small sorts, are still hand-forged in Sheffield, but the vast bulk of the work is executed by belt-hammers and rolling machines. Gas is recognized as the cleanest and most manageable means of heating. Many people still have coke fires, and some of them believe that these possess a certain virtue not to be found in gas fires, in that decarburization does not take place so readily. Decarburization may occur no matter what kind of furnace is used, and is not necessarily more frequent as a result of the use of gas fires.

Whatever means are used to heat the file blank it is of the greatest importance that it should not be

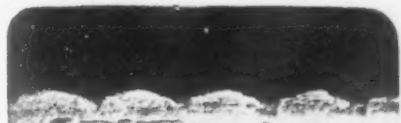


Fig. 1 (left).—Teeth on Ridges Made Too Flat. This file would require too strong an effort if used on broad flat work. Fig. 2 (right).—These Teeth Are Weak Pointed. The overcut is insufficiently filed.



different amounts of manganese which they contain. This element, more than the usual variation in the amount of carbon, determines the depth to which the hardness through and beyond the tooth of the file penetrates. It is objectionable in small files, chiefly because it causes them to harden intensively throughout, and makes them correspondingly brittle. It may be objectionable in large files too, both for that and other reasons. Siemens steels are also generally less free from roaks and other surface defects which, particularly in round files, might cause them to split on hardening. This however does not involve any serious amount of inconvenience and loss, as the roaks are mostly visible after grinding, and the blanks can then be rejected.

Soft files, due to the surface of the ingot and billets becoming decarburized in the reheating furnace prior to rolling, are not distinguishable until they are practically finished. For softness occurring in spots or patches, the rolling-mill is not necessarily to blame. It should be recognized, however, that most of the bars as they leave the mill or forge are surrounded by envelopes of carbonless metal, which may be increased in depth in the subsequent forging and annealing operations, and must be later entirely removed by grinding if soft files are to be avoided.

The troubles which afflict the file-maker, so far as the steel is concerned, might be considerably mitigated. He knows too seldom what the chemical composition of the material is which is delivered to him. Very often, too, he works up material for the sake of cheapness which has been found unsuitable for some other purpose.

The things, then, to be done are: Determine what is the most suitable steel, and then order to that

overheated. When a series of bars are being heated simultaneously, the forger should see that none of them become hotter than is necessary to give them the required shape before the temperature falls below dull redness. Nor should the bar which has to be drawn into a taper file have more of its length raised to a forging heat than will allow the taper to be practically formed. Steel which has been raised to a forging heat and not subsequently forged assumes a coarsely granular structure, which may or may not be remedied by subsequent annealing. If not remedied the hardened file is needlessly brittle in the overheated part, and may break in straightening, cutting, or hardening, or it may break off short in use.

It is advisable that the forger should be instructed: As to the kind of material he is to forge; as to the temperature at which he must work; and, not to leave heated blanks in the fire, but to finish them before leaving his hammer. File forgers are rarely given such particulars; if they were instructed, not only would there be less overheating than now occurs, but they would develop more interest in their work.

If overheating is suspected it should be looked for just beyond the tapered portion. If the fractured surface in that portion is coarser than in the unforced part nearer the tang, the forger and not the rolling-mill is obviously to blame. Needless exposure of the file blank to high temperatures may increase the depth of the decarburized envelope, and lead to irregular patches of soft teeth toward the point of the file. The old saying that the nature has been burnt out of the steel, and it therefore will not harden properly, or has no longer the body necessary to give it the required strength, generally means only that the surface of the file is deficient in carbon, and the coarse crystalline structure allows a crack to be readily started and propagated through it. The demands made on the strength

*From a paper presented before the Iron and Steel Institute, London, May 9.

of a file at the tang end being comparatively small, some degree of overheating may be tolerated in that part, providing it is well-tempered after hardening; still, overheating of steel is always more costly than the proper kind of heating, though the difference may not always be readily perceived.

Another point of considerable importance in forging is the production of a uniform shape of blanks. Under

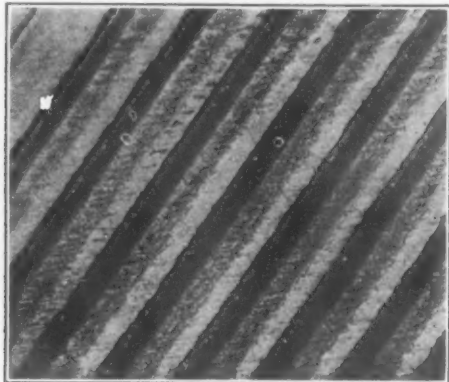


Fig. 3.—Scoring Marks in Ridges of Overcut

present conditions it is practically impossible to produce quantities of blanks that are perfectly uniform, but as future developments in grinding and cutting operations will be based on uniformity of the forged blank, attention must now or later be given to this point. File-makers need the co-operation of engineers with a view to solving this and other problems in file-making, the urgency of which is apparent when we consider the higher organization that exists in America and also in Germany, and the keenness of the competition with which we are likely to be met in the world's markets.

Annealing and Straightening

The latest and most efficient type of annealing furnace is gas-fired. With these furnaces it is possible to anneal much larger quantities of file blanks, and to do them quicker, cleaner, and with better control. All older types of furnaces are still in use, the idea being prevalent in some quarters that the smoky flames of the coal furnace are better for the files. Pyrometric control of annealing temperatures is not universal in the file trade, but it is obvious that in the future pyrometry will be found as useful here as in other branches of the tool-making industry.

The main object of annealing the forged blanks is to make them soft, in order to facilitate the work of the grinder and cutter. It may be taken as a reliable fact that the softer the blanks, so long as the degree of softness is uniform and the shape of the chisel is suitably adapted, the better form of tooth it is possible to make, and obviously the easier and cheaper the grinding and cutting operations become.

In order to harden his chisels the file-cutter quenches them from a temperature between 750 deg. C. and 800 deg. in water. In the quenched state they are too brittle for use, so he reheats them to between 200 deg. and 300 deg., and finds that they have become softer and tougher. If they are still too brittle he reheats them or tempers them to a still higher temperature until a suitable degree of softness and toughness has been reached. He knows that if the chisels had been quenched out in the first instance in warm water, oil, or molten lead, they would have been softer than they were after quenching in cold water, and he should therefore be prepared as a matter of experience to believe: That the hardness of steel depends on the rate at which it is cooled; that having once been hardened it can be softened to some extent by reheating or tempering at temperatures below or up to low redness.

It would be quite impracticable to cut efficient files from many forged blanks unless they were first softened. To make the softening operation absolutely imperative and give greater emphasis to the following observation, let us suppose that the blanks are as hard

as possible; that is to say, let them have been water-quenched. If from this stage they are reheated respectively at 100 deg., 200 deg., 300 deg., 400 deg. C., and so on, they become softer. At 500 deg. C. a faint redness might be seen in the dark, and a hardened file blank after reheating to this temperature had a Brinell hardness number of 321. After reheating to 600 deg. C. the Brinell number was 241; after 700 deg. C. it was 187. In every case, during these observations, the file blank was kept at the stated temperature for two hours, and it was almost a matter of indifference, so far as its hardness was concerned, whether the file blank was allowed to cool in the air or quenched out in cold water. At a temperature of 700 deg. C. we are on the verge of a sudden change, whose effect is clearly illustrated by the following table:

Reheated Deg. C.	Cooled in air	Quenched in water
700.....	187	187
725.....	170	187
750.....	196	255
850.....	241	555
950.....	269	555

These observations show quite clearly that if it is intended to soften file blanks by reheating to a certain temperature and allowing them to cool in the air, a practice by no means unusual in the trade, then the nearer the maximum temperature reached approaches the temperature at which they would harden if water-quenched, the softer they become. If, however, this temperature is overstepped the blanks get harder, and this practice in endeavoring to attain the greatest possible softness is apt to be pushed too far and produce instead blanks of a mixed kind, some being much harder than others, which is always undesirable if regular work at fixed piecework rates has to be done. This method of annealing file blanks is therefore not commendable.

The only remaining alternative is to reheat the blanks to a temperature at which they would harden if water-quenched, and to make the subsequent cooling so slow that they remain suitably soft. The material referred to in the last paragraph, when cooled uniformly from 760 deg. C. in 24 hr. had a Brinell hardness number of 156. It is not essential to keep the blanks in the furnace till they are stone cold; when they are no longer visibly red the cooling can, if desired, be completed with the doors and dampers up, or by drawing the files into the air. By this latter procedure the blanks can be made softer, and more uniformly soft than is possible by any form of reheating followed by cooling in the air. That the blanks are more apt to scale is true, but that can be easily avoided, and is in any case a comparatively small matter.

If the blanks have been overheated in the forge, the annealing furnace is the place to make that defect good; or at least to remedy the defect as far as it is

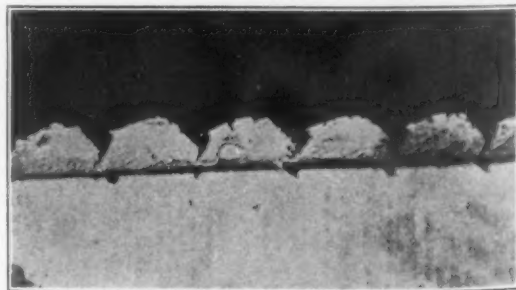


Fig. 4.—Cracks in File Teeth

remediable. The coarse crystalline structure due to overheating is not at all removed by the softening which depends on reheating and air cooling. The coarse may be replaceable by the fine structure only during the passage through at least that range of temperature which confers on the steel the capacity of hardening when water-quenched; and that range of temperature can be used with effect only when the subsequent cooling takes place very slowly.

The file-maker is very conservative in his views. He still continues to use steels containing so much carbon that the file is diffused throughout with a network

of free cementite. This makes the file brittle and adds little or perhaps nothing to the usefulness or wearing quality of the tooth; it adds enormously, however, to the possibility of the teeth cracking during the hardening operation or breaking off in use. It frequently happens that the surface of the file, even below that portion ground away, becomes decarburized to a certain degree and so protects the file-maker against himself.

But the serious objection to the use of the file steel containing over 1 per cent carbon lies in the fact that such steel once overheated cannot be restored by heat-

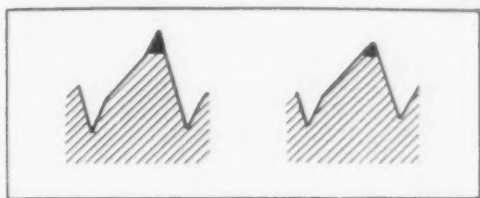


Fig. 5.—File Teeth with Different Clearance Angles

ing to a temperature just above that from which it could be hardened. When fractured the exposed surfaces glare and glisten. If the material is made into a file by the ordinary processes and hardened, a fractured surface has still a coarse, dry appearance, and such files break readily in use even if they happen to pass the ringing test. Such steel can only be restored to a finely crystalline state by heating it to a temperature at which the free cementite cell walls go into solution. When the steel contains as much as $1\frac{1}{2}$ per cent carbon, the temperature required will exceed 900 deg. C. If exposed for a long time, say two or three hours, at that temperature, the outer portions of the bar which by partial decarburization are lower in carbon, become seriously overheated, and one is faced with a fractured bar fairly fine in the mass, but surrounded by a coarsely crystalline envelope, which is sharply divided from the interior portions.

It is important that during annealing the file blanks should lose their shape as little as possible, not only because the subsequent straightening is unproductive labor, but because the blow of the hammer distorts and hardens the material in patches. Very severe blows may cause the parts struck to glaze in grinding or to damage the chisel in the cutting operation. These troubles are rarely ascribed to the straightening operation; less rarely, in fact, than they should be when one remembers that the straightener in some factories is instructed to leave the mark of the hammer face or edge in the blank, so that the grinder must perforate bottom the scale.

To wilfully make a more or less deep impression in the surface of the file blank in order to check the thoroughness of the grinding is but to replace one possible disadvantage by another. It is easy without the depression to see when the scale has been properly ground off. What the depression implies is that the grinder shall remove a measurable thickness of metal below the scaled surface in order that any carbonless surface envelope shall be removed. It is only on very rare and unavoidable occasions that the carbonless envelope would not be removed by the grinder without any precautions being taken. If, however, precautions are necessary, something less objectionable than the mark of the hammer face should be used.

If the surface of the blank is appreciably decarburized the entire surface of the impression left by the hammer is decarburized too, and if the impression is not bottomed on that part at least the cutting edges of the file teeth will be soft. All soft spots in finished files are not due to the above causes, but many of them are directly due to the means taken to avoid them.

Grinding

If file blanks have hard patches, they have been glazed by the grinder; if they have soft places, he has not bottomed the scale. These are almost articles of faith in many factories. Indeed, these statements have been so firmly believed that grinders have actually been dismissed because they were held responsible for soft

files. In this respect the grinder has been most unfairly treated, and affords an instance, of which many might be quoted, of the lack of proper study and investigation of problems affecting the making of files, which has been, and still is, characteristic of file manufacturers.

In the majority of cases soft spots are due to the absurd precautions taken to avoid them. The forged blanks may be seriously decarburized below the bottom of the scale, but no one can tell whether they are or not except by making a microsection, and in any case the grinder is in no way to blame. A grinder has done his duty when he has delivered his work free from "blacks" and level on the surfaces. Either the rolling-mill or the forger is to blame, generally the former. If it is imperative that the grinder should remove a certain thickness of metal from each side of the blank, the most certain way to ensure this is to cut a mark to the required depth and insist on that mark being ground out. In some cases this has been done by means of a small pointed hammer similar to a pick. It is, however, not usually necessary to do more than remove the scale completely. If after this soft files occur, the remedy obviously does not lie in worrying the grinder.

The grinder is also not necessarily responsible for hard patches. For glazing pure and simple he is usually to blame, but in this respect the hand-grinder does not err. If the corner of a softened file blank be pressed heavily upon a revolving emery-wheel it can be quickly raised to incandescence. On being withdrawn the red-hot corner cools instantly, and will be found on trial to have hardened considerably. In this way, on a grinding machine the gritstone can be brought so fiercely upon the blanks that they are locally and momentarily made red-hot. The sudden cooling which follows causes the heated patches to harden, and lays up a store of trouble for the file-cutter. In a milder way, when a machine grinder is working with insufficient water and an excessive amount of pressure, the whole file blank may become hard. Not infrequently file-cutters complain that the grinder has case-hardened the blanks. This is a colloquialism to indicate glazing. The softer the blanks, the less readily does the glazing

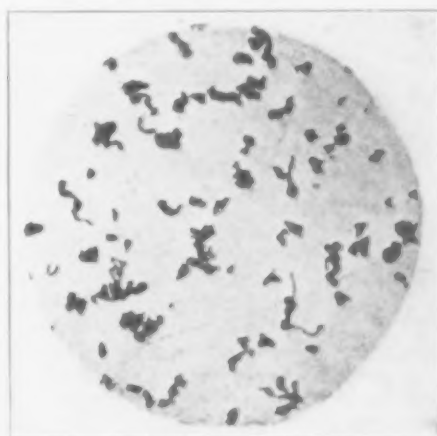


Fig. 6.—Filings Produced by Teeth with Negative Rake

occur; with blanks made from very mild steel its occurrence, for obvious reasons, is practically unknown.

There are four serious defects in grinding which exercise a deleterious influence in the cutting process. These are:

1. The surface of the blank may be ground slightly concave.
2. It may be ground slightly convex.
3. There may be a wavy appearance giving a series of depressions.
4. The surfaces may be covered with scratches due to a coarse gritstone.

If the first and second faults are not regarded as very serious, the cutter will endeavor, so far as bastard and rougher cuts are concerned, to meet the difficulty in the grinding of his chisel. But the remedy is not entirely successful, as the finished file does not possess a perfectly uniform surface. In the one case the file

will not cut at the edges on the flat sides until the middle portion is worn down; in the other case the edges must be worn down before the teeth in the middle can come into operation. The only remedy with such files is regrinding. This applies also to the third defect. The wavy appearance is due to the stone in the machine having worn very small and dancing on the file blanks. The same defect is seen, too, on files which have had the over-cut smoothed down by unequal pressure on an emery-wheel. In the finished file the defect can be plainly seen, and such files ought to be rejected as wasters.

The fourth defect is a difficult one to deal with. It is caused not only in grinding, but in stripping. The finish on a file blank is of importance, and it is the aim of the grinder to produce as smooth a surface as possible. Unfortunately, gritstones vary so much that, no matter how careful a grinder may be, he cannot avoid deep scratches on the blanks. Some stones are soft and fine-grained; others are hard and coarse, or to use a grinder's expression, they are full of pebbles and have no "muck" in them. These latter are



Fig. 7.—Filings Produced by Teeth with Positive Rake

responsible for the worst examples of scoring. When the hacker blades in the grinding machine are brought in contact with the face of the stone to level it, the coarse silica grains acquire sharp cutting points which dig into the blanks during the process of the operation and produce scratches. If such blanks are cut single without further work of smoothing, a series of serrations will be found on the edges of the teeth. If it is remembered that these serrations occur in material which has been brought by sudden distortion to a cutting edge, it is easy to realize not only that the cutting edge becomes thereby less effective and durable, but that they may, as they actually do, serve as starting-points for small hardening cracks which run transversely to the root of the tooth. It is customary, however, to strip practically all files that are to be single cut, and smooth double cut. This may be done either by a file or emery-wheel. This process, although it removes the grinding scratches, may replace them by others almost as objectionable. These remarks apply with even greater force to double cut files, except that the serrations are caused in filing the overcut as well as in the grinding operation.

In order to reduce the defects mentioned to a minimum, if they cannot be removed entirely, a different method of, and different materials for, grinding are required. Perfectly flat and smooth blanks, uniform in size, are required as a preliminary condition to perfection in cutting.

There is also another and very important reason why a new method of grinding should be invented—a human reason. This branch of the trade is unhealthier, dirtier, more laborious and more dangerous than any other, and those who work at it know they

cannot look forward to a healthy vigorous old age, as the average life of a grinder is about 40 years. The attention of engineers might be directed with useful and profitable results toward the invention of a grinding machine, or the adaptation of some existing grinder, in which an artificial wheel with a good supply of water could be used for the grinding of all files, large and small. Something has already been accomplished in this way for round files. The Stead process grinds round blanks automatically from the solid up to $\frac{1}{4}$ in. diameter. Those 5-16 in. and above are first drawn taper under the hammer and then ground. The machine is a very greatly improved design on the gramophone needle grinding apparatus and produces uniform blanks perfectly round. The process is simple and very expeditious; of 4-in. round files as many as 8000 have been ground in 3 hr. The same arrangement may be developed to grind half-round files, with the certainty of producing files that have a perfectly rounded back.

File Cutting

All commercial files, with the exception of certain milled varieties, have teeth which slope more or less backward, Fig. 9. A tool with a negative rake may scrape if it is sharp, but it cannot cut. The teeth of a file may be looked upon as a gang of small cutters, and like the teeth of the milling cutter, they should be formed with a positive rake. The amount of rake would naturally be determined according to the kind of work. For broad surface filing it would be best to use a file with a greater positive rake than would be necessary on narrow surface work. A file cut with a negative rake scrapes rather than cuts.

The next point to be considered is the overcut. The object of the overcut is to provide a number of furrows which will divide the subsequent upcut into a convenient number of separate teeth, and we can imagine that the shape and also the size of the furrows might be allowed to vary considerably without impairing the efficiency of the teeth. I am not aware that this point has been investigated experimentally. From certain experiments I have made, although uncompleted, I am convinced that variation from the present standard will lead to the production of files whose cutting efficiency is considerably higher than that obtaining at the present time. The number of teeth per in. in the overcut as compared with the upcut has an important bearing on the efficiency of files.

The shape of file teeth as viewed from the face is determined by the overcut. Now it is customary to smooth down the ridges raised during the process of overcutting, either by filing them or by the use of an emery-wheel. This is a process where the greatest care and attention is needed, because its influence is second in importance only to the rake.

If the ridges are made too flat the metal does not rise into a proper tooth when the file is upcut, and when the teeth of such files are photographed, Fig. 1, such teeth may be strong, but they are not sharp, and the file will need to be pushed by a strong man if it is to be used on broad surface work. On the other hand, if the upcut is filed insufficiently, the tooth formed by the upcut will flow into a sharp point, Fig. 2. This form of tooth is much too delicate for general use, and although it may cut well on broad, flat surfaces like lathe beds, for example, where the pressure exerted by the man per tooth is necessarily small, there is always a tendency for the teeth to strip or break off. For use on narrow surfaces it would be of little value, because all the teeth would break.

When the overcut is filed down, no matter whether it be by a file or emery-wheel, the ridges should be left with smooth tops. The scoring action of both file and emery-wheel is detrimental to the finished file, in so far as a tendency is given for the teeth to develop cracks. These cracks weaken the teeth, and they readily break off in use. Fig. 3 shows a file with scoring marks left in the ridges of the overcut, and Fig. 4 shows the resulting cracks in the teeth. Great variation exists in this respect between files made by different firms, and there is no remarkable uniformity in files made by the same firm. I do not presume to state to what extent the overcut should be filed. That would depend more

or less on the varying degrees of hardness in the file blanks and the force of the blow exerted, and the overcut would have to be filed accordingly.

The shape and rake of file teeth should, without doubt, differ according to the kind of work upon which they are to be used, but in every case where it is intended that a file should be used as a cutting tool the teeth should have a positive rake. To do this the cutting angle of the chisel must be whetted to such a degree that, taken in conjunction with the angle of bed or machine head, a forward tooth will result. By way of example we will suppose that the machine bed is sloping at an angle of 15 deg., and we desire to produce a positive rake of 5 deg. It is obvious, therefore, that we must whet the chisel to form a cutting angle of 10 deg. on that side which raises the face of the tooth: $15 \text{ deg.} - 10 \text{ deg.} = 5 \text{ deg.}$ This is one of the most important problems in file manufacture, and no satisfactory solution can be obtained until machines are installed in factories for whetting chisels to any desired angle.

The force of the blow exerted by the cutting machine should be sufficient to strike right to the bottom of the overcut. If this is not done the tooth formed, Fig. 4, is weaker than it need be, and breaks off more easily at the root. It is easy with a good hand lens to see whether this has been properly done, and at the same time the shape given to the cutting face of the tooth can be observed.

There remain now to be considered the three important questions of angle of clearance; inclination of the angles of overcut and upcut to the axis of the file; and the number of teeth per in. With regard to the clearance angle, I am in agreement with Edward G. Herbert, who says: "The slope of the back face of the tooth, or clearance, is very difficult to measure, because it is not a plane surface, Fig. 5. It is probably very important in relation to the durability and to the total output of work. A file which has worn out has the ends of its teeth flattened or rounded. When the area of contact of the teeth with the work attains a certain value, great pressure is required to cause the teeth to penetrate the metal. The amount of work that can be got from a file therefore depends largely on the volume of tooth available for wear before this limiting area is attained. Fig. 5 shows two file teeth with different clearance angles. The part of the tooth available for wear is shaded, and it is evident that the tooth with greater clearance presents a much greater volume of tooth for wear before the limiting or slipping area is presented to the work. There is a limit to the amount of clearance that can be safely given, because the tooth must not be left so weak as to break under working conditions. . . .

"Examination of the files shows that these angles are extremely variable, and it is certain that uniformly satisfactory results cannot be obtained unless correct angles are ascertained and maintained by means which will leave no scope for variation of judgment on the part of the workman."

The inclination of the overcut and upcut to the axis of the file has considerable influence on the efficiency of the tool, and in this respect the variations that exist, not only among files of different makes, but also among files by the same maker, are very great.

It may be said that the inclination of the overcut fixes the position of the teeth in relation to each other, and that of the upcut fixes the angle at which the face of the tooth is presented to the work. The possible variation in the inclination of the overcut and the upcut to the axis of the file can be advantageously manipulated to produce files to cut particular kinds of metal. This is done in the case of files intended for use on brass and aluminum. Some results of varying the inclination of the upcut of files are to be seen in Figs. 6 and 7. If the upcut lies obliquely across the file, the filings will be similar to those shown in Fig. 7. If, however, the file tooth lies squarely across the file, then the filings have the shape of a volute spring, as shown in Fig. 8. But in either case, if the tooth has a large negative rake, the filings may be shapeless scrapings, like those in Fig. 6.

The number of teeth per in., and the ratio between overcut and upcut, are also factors in the efficiency of the file. Variations of both factors within fairly large limits may be made without the efficiency of the file suffering. With the upcut 19 teeth per in. on a 14-in. bastard cut file, variations in the overcut from 6 to 15 teeth per in. may be made without loss of cutting efficiency. Sufficient experiments, however, have not been made in the ratio variations to enable any standard to be accepted as the most satisfactory. Mr. Herbert is right when he says: "The ratio may prove to be one of the most important factors in file efficiency."

The difference in the efficiency of the two sides of a file is due to a combination of causes. These may be enumerated as follows: Unequal blow of the chisel; unequal filing of the overcut; unequal whetting of chisel; working too long with chisel; the effect of the file bed; and the variation in grinding; that is, the more or less complete removal of the decarburized envelope. Furthermore, the cutting edges of a file may



Fig. 8.—If the Teeth Lie Squarely Across the File, the Filings Have the Shape of a Volute Spring



Fig. 9.—Teeth with a Backward Slope

not always lie in the same plane along the 6 in. of its length tested. It is extremely doubtful that the two sides of a file chosen at random can be uniform under the present system of manufacture.

The extreme top of the teeth are sometimes bent backward, and very rarely may be accidentally bent forward even. All machine cutting, at any rate in this country, is executed from point to tang. After cutting a tooth the chisel is withdrawn from the impression made, and the traverse of the machine bed brings the blank forward to receive the next blow. If the chisel has not quite cleared the tooth before the bed moves forward, it catches on the tooth and bends the extreme tip of it backwards. Many of the newer forms of file-cutting machines are continuously fed forward by a screw instead of the older form of ratchet motion. When the machine bed is being fed forward continuously, the chisel must always be withdrawn against the face of the newly formed tooth, and the pressure between the two is the force with which the bed is being fed forward. On hard steels the tooth may resist this pressure without being bent backwards, but on soft steels the tips of the teeth would be very apt to become pushed backward without being able to spring again into normal shape. An occurrence of this kind increases the disadvantage of a negative rake which already exists, and may make a tooth hopelessly inefficient in spite of the main face having a positive rake. Only a small portion of the tooth of a file is worn away in actual use. The rake of this portion only determines its cut-

ting efficiency, and unintentionally, in the way suggested, this may be made better or worse.

Heating

There can be little doubt that uniformity of heating is obtained more easily in the lead bath than in the hearth. Besides, being cleaner, the lead bath is more manageable. To get the best results it is advisable to use pyrometers either of the Sentinel or Indicator type. The uniformity of the temperature of the bath can be maintained very well by the use of sentinels if they are used in the following manner:

If it is desired to work at a heat between 750 deg. C. and 780 deg. C., procure two pieces of ordinary iron gas-piping with one closed end. The length should be about 10 in., or as long as desired for the bath. Stamp

on each tube the melting point of the sentinels to be used. In the first case this will be 750 deg. C., and in the second 780 deg. C. Take two pieces of wire longer than the tubes and bend one end in the form of a hook. After placing the sentinels in their respective tubes, raise to melting point and insert the wires. On cooling, the salts will solidify and fasten the wires so that the tubes may be lifted by them. The tubes are now placed in the lead bath and the temperature raised sufficiently to melt the 750 deg. C. sentinels, but not those in the second tube, whose melting point is 780 deg. C. This can be easily ascertained by lifting the wire. In this way it is comparatively easy to maintain the heat desired, and to test the temperature of the bath in any part. A regular use of the sentinels or the indicator will considerably lessen the risks of quenching at a lower heat than is necessary to properly harden the files.

Oxygen in Cast Iron and Its Application*

A Confirmation of the Johnson Theory—Steel in the Mixture Introduces Oxygen—Cast Iron Gas Shells

—BY WILFORD L. STORK—

CERTAIN influences of oxygen on iron have been known for many years and it has always been considered one of the worst enemies of the iron and steel founders. Nobody had a good word for it, hence little was done to make use of this oxygen. In all the fields of foundry practice the desideratum was "melt without oxidation of the metal."

In the consideration of the influence of oxygen on cast iron, we must not confuse this condition with oxidized iron caused by poor melting conditions, due to a high bed, heavy charges, low coke ratio, excessive melting rate, high blast, or poor charging. The writer has had experience both in melting under such poor conditions and in remedying these bad conditions and considers the product far inferior to iron melted under normal conditions. This oxidized condition cannot be counteracted or removed by any of the known deoxidizers; it can be remedied only by proper melting conditions. Such iron is really burned, whereas the iron considered in this paper was melted under normal conditions with moderate blast, correct bed height, light charges of iron, and low coke consumption and is not in this category at all.

The Johnson Theory

In 1914 the late J. E. Johnson, Jr., startled the metallurgists of the world when he published his results on the advantages of oxygen on cast iron. His work is so convincing and so logical, in spite of the common and well-established notions on the subject, that nobody has been able to refute a single argument. Such an eminent authority on iron and steel metallurgy as Prof. H. M. Howe has accepted the work in all its details in his latest book. The work of J. E. Johnson, Jr., has revolutionized the metallurgy of cast iron and it seems apparent that all future work must include an oxygen determination just as we include silicon, sulphur, phosphorus, manganese, and carbon in our everyday analyses. A summary of the part of this work that applies directly to the contents of this paper is as follows:

Iron containing oxygen solidifies at a higher temperature than iron of the same composition containing no oxygen.

Oxygen increases the strength of cast iron.

Iron containing oxygen, if cast in sand, contains somewhat more combined carbon than a similar iron not containing oxygen.

Iron containing oxygen, if cast against a chilling surface, will show a white chill at a higher silicon than a similar iron

not containing oxygen, and will show a greater chill for the same silicon as the latter element decreases.

When manganese is added to a metal high in oxygen, some of the latter is removed and the chilling power and strength are thereby reduced.

Steel, when added to cupola mixtures, is oxidized and it is this oxygen content that gives such mixtures its superior physical properties.

The purpose of this paper is to give further evidence in support of the above theories and to show their application to cupola mixtures.

Iron poured hot will always have more combined carbon in the test bar or casting than the same iron poured colder by holding it in the ladle; this is true for both white cast iron and gray iron. It is possible to get a white, mottled, or gray fracture of white cast iron, simply by pouring at different temperatures. But when iron is held in a boiling ladle (first catch in a relined ladle), the heat of the molten iron drives off the water of combination from the clay, which when converted into steam passes through the iron causing boiling. The steam is decomposed into hydrogen and oxygen; the oxygen attaches itself to the iron molecules and the hydrogen passes off to the atmosphere. The result is the iron becomes less fluid, not merely due to its lowering temperature, and the combined carbon is increased as shown in the following analyses:

	Series A		Series B	
	Poured hot, per cent	Poured after boiling, per cent	Poured hot, per cent	Poured after boiling, per cent
Combined carbon..	0.40	0.64	0.28	0.44
Graphitic carbon..	2.85	2.96	3.08	3.04
Manganese	0.81	0.70	0.82	0.82
Phosphorus	0.309	0.301	0.340	0.316
Sulphur	0.113	0.0604	0.096	0.083
Silicon	1.98	1.90	2.04	2.03

In series A, the manganese and the sulphur are reduced in the proportion of 2:1, the theoretical proportion to form manganese sulphide; also the silicon is oxidized. The iron in the state of boiling gave the manganese and sulphur the opportunity and time to get together to form manganese sulphide, which rises to the surface as slag. The oxygen content of the iron increased its combined carbon and raised its melting point, causing it to become sluggish.

The Loss of Manganese

In melting much iron of different analyses, day by day, the adjustment for the manganese loss varied in the different mixtures, but was quite constant in each particular grade. This had to be considered in order to keep the mixtures up to specifications. The mixtures carrying steel lost a greater proportion of man-

*From a paper to be presented at the Chicago meeting of the American Institute of Mining and Metallurgical Engineers in September, 1919. The author was formerly metallurgist, Michigan Motor Castings Co., Division of Buick, Flint, Mich.

ganese than those without steel. For instance, in a mixture of 50 per cent pig iron and 50 per cent remelt, the manganese content was:

	Charged	Spout	Loss	Loss per cent
Manganese	80	69	11	13.7

whereas in a cylinder mixture made up of 15 per cent steel, 40-50 per cent remelt and 45-35 per cent pig iron, the manganese content was:

	Charged	Spout	Loss	Loss per cent
Manganese	90	71	19	21.1

With special mixtures, as will be shown later, the loss of manganese is considerably higher. These are the results of averages over a period of months of operation.

Effect of Adding Steel

The steel in the cupola oxidizes, adding oxygen to the mixture, which in turn is removed by the manganese. The percentage of manganese lost increases with the increased steel content of the mixture, for, the higher the steel content the greater is the oxidation and the more oxygen to be removed. In the cylinder mixture carrying 15 per cent steel it was necessary to charge the iron at 0.90 per cent or above in manganese, in order to give the iron proper fluidity to run such complicated castings as automobile cylinders. The oxygen content due to the steel raised its melting point. Of two irons at the same temperature, the one with the lower freezing point will have more superheat and more life than the one with the higher freezing point. The oxygen added to the iron through the steel raises its melting point, causing it to become sluggish; and in order to give the iron the required life, it must be deoxidized with manganese. This fact was so readily observed that fluidity was controlled entirely by manganese.

Iron with 20 per cent steel chills more easily, has a greater shrinkage, is harder, and will throw a deeper chill than iron with 10 per cent steel, unless extra manganese is added to remove this additional oxygen.

Cast Iron for Gas Shells

With the advent of the United States in the great world war, this country followed the experiences of France, Italy, and Germany in specifying cast iron for its 155-mm. gas shells. In order to meet the Government's severe specification for this material, the writer applied the aforesaid theories and facts to his mixtures and had good success. The iron was deliberately impregnated with oxygen by heavy percentages of steel and deoxidation was prevented by keeping the manganese below 0.45 and always above 0.33 per cent. The Government demanded a tensile strength of over 32,000 lb. per sq. in. (2249 kg. per sq. cm.) and an impact test. The impact test required that a 1¼-in. (32-mm.) square test bar supported on knife edges, 6 in. (152 mm.) center to center, should not break before the 25-lb. (11-kg.) hammer, carrying a knife edge, reached 18 in. (46 cm.) starting at 12 in. (30 cm.) and increasing by ½ in. (12.7 mm.) increments. Mixtures were made of 35-40 per cent steel, 35 per cent remelt, and 30-25 per cent pig iron. Typical analyses and physical properties of two heats containing 150 lb. Star pig iron, 450 lb. Toledo pig iron, 700 lb. remelt, 700 lb. steel, 2 lb. ferromanganese are as follows:

Silicon, per cent	Sulphur, per cent	Phosphorus, per cent	Manganese, per cent	Combined carbon, per cent	Graphitic carbon, per cent	Total carbon, per cent	Chill, in.	Transverse, lb. per sq. in.	Impact, in.	Brinell number
1.33	0.121	0.194	0.45	0.78	2.42	3.20	0.10	3300	22.5	420
1.35	0.121	0.208	0.45	0.81	2.39	3.20	Trace	3400	24.0	420

The tensile strength ran from 32,000 to 37,000 lb. per sq. in.; bars which broke below 32,000 lb. proved to be defective castings.

The results bear out the various contentions in reference to the oxidation of steel in cupola mixtures and the effect of oxygen on cast iron. For like silicon con-

tents, the combined carbon and chill are decreased as the manganese is increased, due to the manganese acting as a deoxidizer.

The manganese loss was very high in these mixtures, as shown by the following, with which the losses under less oxidizing conditions are repeated for comparison.

Per cent steel	Manganese			
	Charged	Spout	Loss	Per cent loss
0	80	69	11	13.7
15	90	71	19	21.1
35	64	38	26	40.0

There was an abnormally large amount of slag in these runs and it became necessary to reduce the limestone from 30 to 20 lb. (8 to 9 kg.) per ton of iron, then it was found possible to discontinue the use of limestone with these heavy steel charges. Without any limestone the slag was sufficiently fluid and no trouble was experienced from a viscous slag due to the fact that there was sufficient FeO to flux with the SiO₂, and a good running slag was produced. The slag analyses proved the high oxidation of the steel. Below is given the analysis of a slag made from the shell mixture using no limestone as compared with those of slags made from 0 and 10 per cent steel, using 80 lb. of limestone per ton of iron.

	No steel added	10-per-cent steel	35-per-cent steel
SiO ₂	42.6	44.3	52.78
Al ₂ O ₃	26.2	22.7	21.60
CaO	30.4	26.4	2.88
MgO	3.0	2.6	4.45
FeO	1.3	2.5	13.60
MnO	1.6	1.8	3.64

The increase in FeO and MnO in the increased percentages of steel proves the conditions in the melting of the iron and corroborates its effects on the iron. Also with 0 to 10 per cent steel, the slag hole was opened only after 2 to 2½ hr. of operation, whereas with these special steel charges it was advisable and almost necessary to slag the cupola 30 to 40 min. after the first tap.

Proof of the Johnson Theory

The contents of this paper prove the validity of the late J. E. Johnson, Jr.'s, theory of oxygen in cast iron and show how it has been applied to cupola mixtures to obtain iron of definite physical properties and also how it explains many conditions met with in foundry practice. Even the chill can be controlled by varying the manganese in irons containing oxygen and the influence of oxygen on the fluidity can be controlled by the manganese. The oxygen content can be controlled directly by steel additions and indirectly by varying the manganese. While this method is not as good as the patented process of oxygenating cast iron, nevertheless we can make use of the method indirectly and can apply the theory involved to our daily foundry problems. It also shows the absurdity at times of considering the influence of silicon on the chill, strength, or fluidity of cast iron when the oxygen content is neglected, as we can produce almost any desired chill for any silicon content simply by varying the oxygen.

Exchange Favors German Trade in Belgium

The possibility that Germany may get Belgium's reconstruction orders is emphasized in an article in the *Anglo-American Trade*, the monthly organ of the American Chamber of Commerce in London, which sets forth the views of a banker-member just returned from that country. This situation is analyzed as follows:

Superficially the country presents an unexpectedly normal aspect. But industry in the large sense is still at a standstill and 1,000,000 francs a day are being spent in unemployment benefits.

Unless America and Great Britain are ready to find credits, and for longer terms than any yet granted, Belgium is fated to turn to Germany for all that can be procured there, and, except for certain raw materials, all that Belgium needs Germany can and will sell.

The mark is cheap to the Belgian; the dollar is an expensive luxury. If we wish to put the dollar within his reach we must postpone the time of payment for what he buys from us until he can pay in goods and not in depreciated francs.

CONDITIONS IN JAPAN

Overstocked with Steel—Wages Low and Labor Very Inefficient

WASHINGTON, June 17.—Japan is overstocked with steel and with 114 electric furnaces now in operation, some Japanese experts hope to see it producing all of its own steel within two years. These are the chief features of a special report which has been made to the Bureau of Foreign and Domestic Commerce by Trade Commissioner W. H. Rastall, on the market for industrial machinery in Japan. Commissioner Rastall points out the low efficiency of low-paid Japanese labor as an element giving advantage to American industry. He also calls attention to the Japanese preference for American wares over those of Great Britain in certain lines. The report contains a series of valuable pointers for American machinery concerns seeking to develop a Japanese market.

"American manufacturers of industrial machinery," declares the report, "should use great foresight in developing their policies for the years 1919 and 1920. Reconstruction in Europe will provide a market for much of this machinery, but this should not be allowed to result in neglect of the Japanese market, as this demand will be large and cover a great variety of equipment. The European war has caused a great industrial expansion in Japan. Many new factories have been established and efforts have been made to develop new industries, with the result that good profits have been secured in most instances where it was possible to produce actively.

"This expansion of industry was based largely on conditions peculiar to war times, and Japanese business men, capitalists and officials are now making great efforts to maintain them on a peace basis and also to expand in capacity or in new directions as opportunity offers. Ample capital seems to be available.

"For a short time the Japanese market will be demoralized, as the armistice seems to have been more of a surprise to Japanese business men than to those of other countries. Also excessively high freight rates have made the difference between war-time prices and peace-time prices much greater than is experienced in America.

"It will require considerable time and very careful management to dispose of present stocks of raw materials without excessive loss. But even if these conditions result in financial panic, as some prophecy, it is anticipated that the recovery will be rapid. There is a liberal amount of liquid capital in the country resulting from the handsome war profits, and it will probably seek employment in industry, as was the case following the Russo-Japanese war.

"It is true that there has been a much lesser activity in shipbuilding, and freight rates have fallen greatly. Also, the country is overstocked with heavy chemicals, steel, etc., but the results to industry will probably not be so serious as would at first appear.

"On the other hand, certain individuals hope to see Japan making all of its own steel within two years, and 114 electric furnaces are reported in operation. The textile industries will undoubtedly be expanded rapidly, and there will be a good increase in steam and waterpower electric plants. In fact, Japan gives promise of early, rapid and extensive industrial expansion, and will require a great deal of machinery of all varieties.

"In this connection American machinery manufacturers will meet competition, but should not exaggerate its importance.

"Certain Japanese shops will try to produce the simpler types of equipment, but it is not at all certain that they can meet American prices, for although Japanese labor is paid a low rate per day, the shops are so poorly equipped that the production is very low, so that in many lines the total labor charge is higher than in America.

"Great Britain will undoubtedly make great efforts whenever possible. In January English sellers of steel started canvassing the Japanese market, offering plates

for July delivery at attractive margins under the American prices. However, British machinery is rarely of the same type as developed in America, and the Japanese will frequently prefer the American product, even at considerably higher prices, if the advantages of the American article are properly presented."

Further Advances in German Steel Prices

At a meeting of the German Steelworks Union, April 30, it was decided to advance prices on iron and steel products as follows:

Product	Advance		New Price	
	Marks per ton	Dollars (approx.)	Marks per ton	Dollars (approx.)
Bar iron	115	\$27.37	550	\$130.90
Ingots	20	4.75	405	96.39
Blooms	50	11.90	440	104.72
Billets	75	17.85	475	113.05
Sheet Bars	75	17.85	480	114.24
Sections	110	26.18	600	142.80

The equivalents in United States money are computed on a valuation of the German mark at 23.8c., though in the absence of exchange with Germany the exact value of the mark is problematical. The advances mentioned, it was conceded by both consumers and merchants, would not cover the net cost of operating the works. The new prices are to be effective for two months.

Holland Aiding Her Manufacturers

The Holland Industrial Fair, which has held exhibitions of Dutch manufactures annually since 1917 at Utrecht, Holland, is giving wide circulation to blank forms for the convenience of those who want to purchase her products. The forms are to be forwarded to the Commercial Intelligence Department of the fair. They emphasize that only articles exclusively manufactured in Holland will be displayed or assisted, all products being carefully inspected to this end. The service is gratis. In 1917 the fair had 690 exhibitors, occupying 29,000 sq. ft., whereas this year it has 1276, using 71,000 sq. ft. and 2062 stands. It is a national project.

Spain's Iron Ore and Other Exports

Spain's exports of iron ore and other products, as well as imports in 1918, according to *Revista Minera*, were as follows in metric tons:

	Imports	
	1918	1917
Pig iron	6,452	14,700
Steel rails, bars and sheets..	6,294	10,222
Tin plates	877	1,241
	Exports	
	1918	1917
Iron ore	4,292,406	5,137,621
Iron pyrites	1,035,701	1,964,937
Manganese ore	22,520	21,627
Pig iron	29	33,198

Exports of copper ore and of spelter and pig lead were also large in both years.

Engineering Congress for Java in 1920

A general engineering congress to last six days is to be held at Batavia, Java, May, 1920, under the patronage of J. P. Earl van Limburg Stirum, LL.D., Governor-General of Netherlands, East India. Among the presidents of the congress will be R. de Kat, M.E., director of the Department of Government Industries. A second bulletin dealing with the Congress has been issued. It states that all correspondence relating to the subject should be addressed to the secretary, 3 Molenvliet-Oost, Weltevredere, Java.

Hardware Restrictions Removed

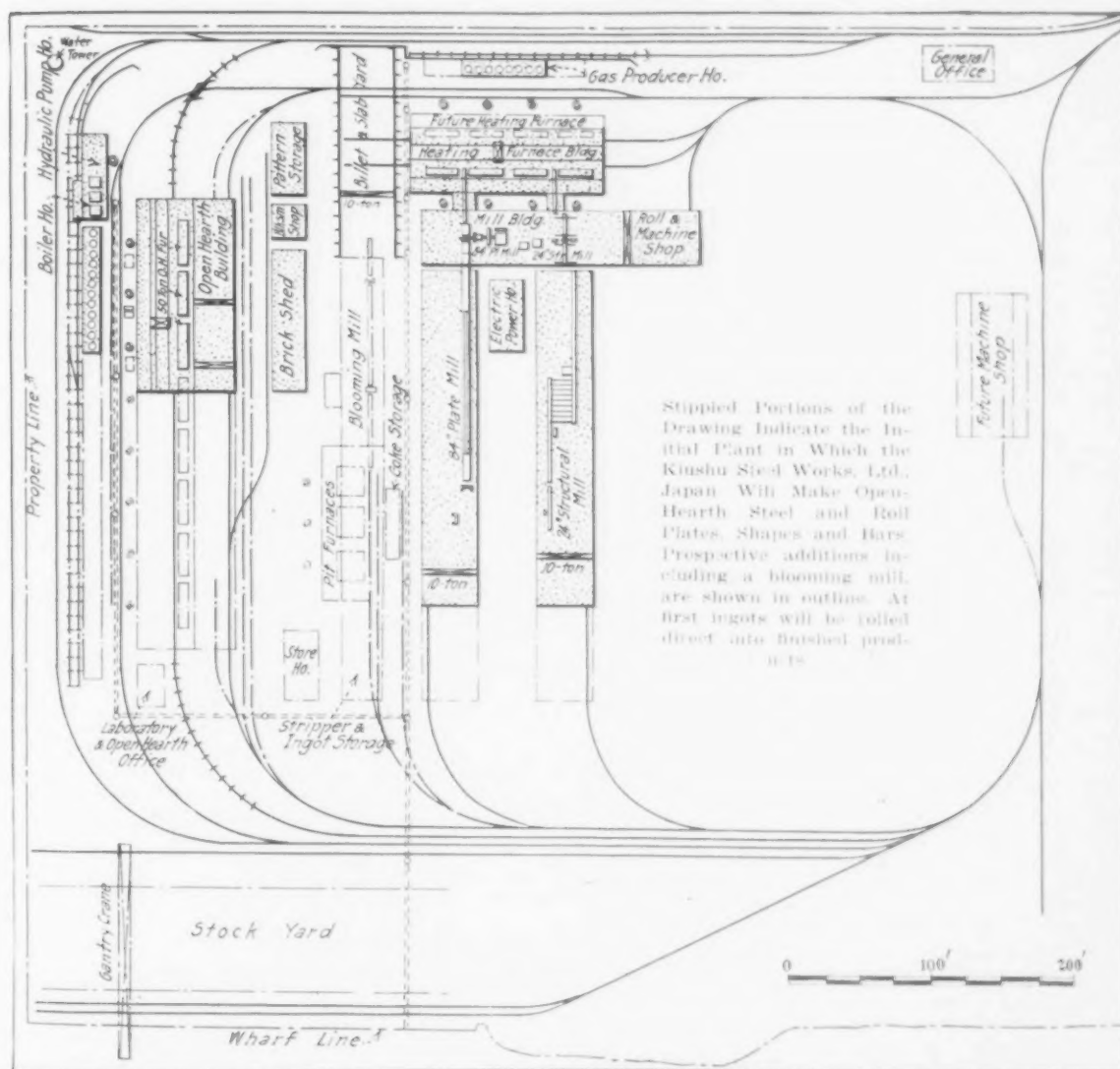
WASHINGTON, June 10.—Consul General Skinner cables from London that the British Government will permit the importation of stoves and ranges and locks, including padlocks only under license, as and when required, but has removed the import restrictions from "all hardware not otherwise specifically mentioned."

A NEW STEEL WORKS IN JAPAN

To Roll Plates, Shapes and Bars Direct from Ingots—Blooming Mill to Be Added

In February, 1918, the Kiushu Steel Works, Ltd., Yawata, Japan, engaged the S. R. Smythe Co., Pittsburgh, to act as consulting and contracting engineer to prepare drawings for a complete open-hearth steel plant, including buildings, foundations, gas producer

from the United States Government in January, and complete shipment by the way of Tacoma, Wash., accomplished prior to April 15, 1919. The Westinghouse Electric & Mfg. Co. furnished all the rolling mill and other motors, the entire plant being electrically driven. The 84-in. plate mill, tables, shears, etc., were furnished by the Morgan Engineering Co., Alliance, Ohio. The 24-in. structural mill, tables, saws, shears, etc., were furnished by the Mackintosh-Hemphill Co., Pittsburgh. The traveling cranes were furnished by the Alliance Machine Co., Alliance, Ohio. The charging



plant and rolling mills, to produce plates, structural shapes and bars. H. D. Wilson, 2 Ross Street, Pittsburgh, was the resident agent and representative of the Kiushu Steel Works, Ltd., through whom all the contracts were awarded and the supervision as to inspection, shipment and approval was accomplished. The general plan of the plant given herewith shows the arrangement and layout.

The initial plant will have three 50-ton basic open-hearth furnaces with space provided for five additional. The three are to be operated with 12 Smythe gas producers. The reversing valves are of the Schild sliding type, built in combination, the gas valve being 33 in., and the air valve 36 in. in diameter. The stacks are built of concrete lined with fire brick. The heating furnaces supplying the plate and structural mills consist of four 4-door, side-charge type. There is space reserved for four additional furnaces. A floor type charging machine will charge and draw ingots and deliver to the mill tables. The heating furnaces are operated with eight Smythe gas producers. The reversing valves are the Schild sliding type built in combination, 27-in. for gas and 30-in. for air.

About 1500 tons of steel and iron required by the plant has been shipped, license having been secured

machine for the open-hearth plant and floor charging machine was furnished by Wellman-Seaver-Morgan Co., Cleveland. The steel ladles were furnished by the Treadwell Construction Co., Midland, Pa. All the buildings, charging floor, etc., are of steel construction, but the steel will be furnished and fabricated in Japan.

Ingots will be rolled direct into finished plates and, for the present, direct into shapes and bars also, but provision is made for installing a 35-in. blooming mill, motor driving, when top-cast ingots will be produced and then bloomed into slabs and blooms for both the 84-in. plate and 24-in. structural mills. The initial plant when complete and erected in Japan will cost close to \$3,000,000 of which about \$2,000,000 in material has been shipped from this country.

The Heinle Co., Crafton, Pa., metal rolling engineers, has added a self-explanatory chart on rolled hexagons to the number of other charts already issued. This chart sets forth a positive three-pass method for rolling hexagons either by guide or by hand. Dimensions of the bar anywhere in the progressive conformation can be secured and set forth so that positive control is had over the mechanical conditions during rolling.

SURPLUS MACHINE TOOLS

Method of Inspectors in Fixing Valuation before Making Sales

WASHINGTON, June 17.—The Machine Tool Section of the office of the Director of Sales of the War Department has made public the charts by means of which its inspectors are now fixing the valuation of the surplus machine tools held by the Government.

The general outline of these charts has already been published in THE IRON AGE (May 29, 1919, page 1462), but the charts themselves were not then available for publication. The rules for use of the charts are given at length below in the accompanying illustration.

In issuing the charts, the Machine Tool Section made public the following statement concerning its activities to date:

"The signing of the armistice that terminated hostilities between the Allied and Central powers practically suspended operations in approximately 500 manufacturing plants in the United States which, operating under Government lease or contract, were engaged in supplying equipment to the various War Depart-

facturers and the plant facilities and equipment that their assumption of war work had entailed.

"The duty of recovering as large a percentage as possible of the vast sums of Government money tied up in surplus war materials devolved upon the War Department, and a policy for effecting this purpose had to be evolved. To flood the market with the stocks of commodities held by the Government contractors and the machinery with which they had been manufactured would not only mean their sacrifices, but the upsetting of industrial conditions in general.

"To preclude such a situation, the office of the Director of Sales was created. President Wilson, proceeding under the Act of July 9, 1918, by which the sale of surplus war material was authorized, had appointed Benedict Crowell, Assistant Secretary of War, to organize a selling force to dispose of this surplus, and Mr. Crowell, in turn, by a War Department order dated Jan. 17, 1919, designated C. W. Hare, then Assistant Director of Munitions, as Director of Sales with authority to make sales for the War Department in accordance with the provisions of the act of July 9, 1918.

The Director of Sales, having appointed a corps of assistants, each chosen because of his previous familiarity with the com-

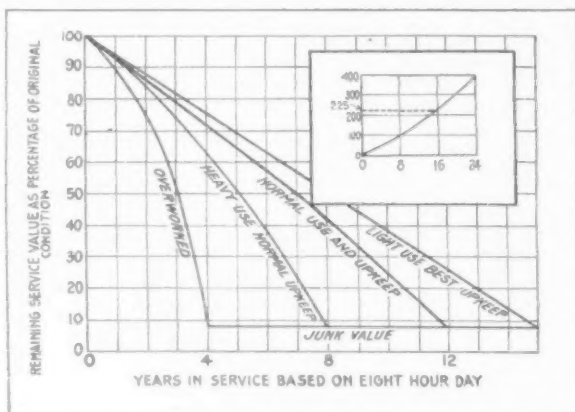


CHART FOR USE IN APPRAISAL OF STANDARD MACHINE TOOLS TO DETERMINE SERVICE VALUE

A. In using this chart ascertain from best sources, as completely as practicable, preferably from shop superintendents, foremen, U. S. inspectors or plant records, for each tool or group of tools:

1. Actual time of use in years.
2. Average number of hours per day in use.
3. Class of usage and upkeep (see curves below).

B. Reduce the actual time of use (A1) to the equivalent standard 8-hr. day usage by the reduction factor obtained from small chart on the right.

C. Enter main chart below with equivalent years of use (B) on base line, read vertically to appropriate curve (A3), then horizontally to left for percentage of condition. This percentage is to be recorded on inventory card unless altered in accordance with paragraph following (D).

D. Examine the tool for evidences of:

1. Exceptionally good care, maintenance and operation above normal. If justified, the percentage derived under preceding paragraph (C) may be increased, but not to exceed five (5) per cent.
2. Abuse or exceptionally poor care, either in usage, upkeep, handling or storage, below normal. If justified, the percentage derived from preceding paragraph (C) may be decreased, but, in general, not more than ten (10) per cent. The use of the *overworked* curve will cover most cases.
3. Broken or missing standard parts or equipment. This can be taken care of by an appropriate reduction from the performance previously determined, unless cost of replacement can be estimated with reasonable accuracy, which is preferable.
4. The percentage determined by consideration under

paragraph C, as altered under paragraph D, is to be entered on the inventory card and noted in "Remarks" with brief statement of reasons for the exercise of special action.

E. Original cost, market price, obsolescence, amortization and demand are not to be considered in using this chart, but as separate factors in price determination.

Example.—The machine was in use the equivalent of 6 yr. with *normal use and below normal upkeep*.

Method of Application.—Enter the chart along base line at 6. Follow vertically to "normal use and upkeep" curve. Read horizontally to left to 57 per cent. By use of judgment, under D2 it is determined that 5 per cent should be deducted; 57 per cent less 5 per cent gives 52 per cent. Entry on card, "Condition 52 per cent; in remarks, "Normal use, 5 per cent deducted for below normal upkeep."

REDUCTION FACTOR—SMALL CHART TO RIGHT

This chart is to be used in conjunction with the main chart to obtain uniformity of results in those cases where shops have operated at other than 8 hr. per day, on which the main chart is based.

Having determined the number of hours per day at which the tool was operated (A2), read from this number on base line vertically to curve, then horizontally to the side for the reduction factor.

Example.—The machinery in the plant was operated for a period of 1½ yr. (A1) at 24 hr. per day (A2).

Method of Application.—From the chart the factor is found to be 400 for 24 hr. use. Multiply the period of actual use 1½ yr. by factor, 400. Result 6, which is the equivalent number for years on 8 hr. usage and is the time to be used in reading the main chart.

ment bureaus. Aside from the Government arsenals, practically all of these plants were turning out, as component parts or finished products, materials which were foreign to their peace-time productions. Their conversion to Government needs had necessitated, in many instances at least, the installation of new machinery and the construction of plant additions. To stimulate the production of the commodities on which they were engaged the War Department had provided the funds with which the machinery had been purchased and the additions constructed.

"Consequently, when the need for further production of the war material ended with the cessation of hostilities, the War Department had to take over the surplus commodities held by these emergency manu-

facturers over which he was to be given supervision, classified the material to be disposed of and created seven sections to supervise its disposition according to classification.

"These sections and the materials classified under each are as follows:

MACHINE TOOLS SECTION

Metal and woodworking tools, hand tools, forging equipment, iron and structural workers' power tools and machinery.

PLANT FACILITIES SECTION

Manufacturing plants, completed or uncompleted, warehouses, wharfage and utilities connected with each.

CONTRACTORS' AND RAILWAY EQUIPMENT AND BUILDING MATERIAL SECTION

All building materials, when sold as such, refrigeration, heating and power plant equipment, railway rolling stock

and equipment, track materials, steam shovels, cranes, general contractors' equipment, dredges, ditches, concrete mixers, industrial railways, logging equipment and sawmills.

MOTOR VEHICLES, VEHICLES, AND AIRCRAFT SECTION

Motor vehicles, other vehicles and equipment, and aircraft.

QUARTERMASTER STORES SECTION

Clothing and equipage, general supplies, subsistence, regiment, medical and hospital supplies, office equipment and miscellaneous supplies.

ORDNANCE AND ORDNANCE STORES SECTION

Tractors, tanks and trailers, tools, chemical and trench warfare material, artillery, small arms, machine guns and manufactured ammunition for the same, metal components, target material and aircraft armament.

RAW MATERIALS AND SCRAP SECTION

Acids, chemicals, explosives, ferrous and nonferrous metals.

"The Office of Director of Sales was not designed to be a selling agency, but to exercise general supervision over the disposal of the surplus war material; to formulate sales policies; determine methods of sale; and fix the prices at which the commodities offered should be sold.

"The actual selling of surplus war materials is done by the several bureaus of the War Department by which title to the property to be disposed of is held. These sales of surplus to the general public are made in accordance with the following rules formulated by the Director of Sales:

- (a) For cash at auction.
- (b) To the highest bidder on sealed proposals on due public notice and in such market as the public interests require.
- (c) At the current market price, if there is an established market for such property and current market quotations accompany the report of the sale. No sale at the current market price shall be made except under continuously maintained competitive conditions and with full publicity.
- (d) By negotiations under competitive conditions, and providing the price obtained is not less than a price fixed by appraisal, or is the highest of not less than three independent competitive bids.

"The Machine Tool Section was created early in January, 1919, to gather the data essential to the performance of these functions in so far as they affected the large amount of machinery which the Government had been called to take over from the approximately 500 factories that had been engaged in supplying war equipment to the War Department.

"Before the policies and methods of sale could be determined, or prices to be asked for this machinery could be arrived at, it was necessary to establish a uniform system of inventorying that would show the quantity of machine tools to be disposed of, describe and locate each tool, and give its present condition. This information was essential to assure the Government a fair value for its property and to facilitate reasonable bids from prospective buyers of the machinery which they desired to purchase.

"Knowing the value of the time element in making appraisals of machinery the Machine Tool Section undertook, along with the compilation of the inventories, to obtain complete appraisal information. Its aim was to eliminate as far as possible the variable incident to individual opinion. The subject was taken up early in February with the several bureaus of the War Department and the War Industries Readjustment Committee of the American Society of Mechanical Engineers, consisting of G. K. Parsons, of New York, a consulting engineer; Erick V. Oberg, of New York, editor of *Machinery*; the Industrial Press, and Frederick A. Scheffler, of New York, a supervising engineer. As a result of these cooperative efforts, a graphical chart for appraisals was adopted late in May at a conference in New York participated in by the members of the War Industries Readjustment Committee and Majors C. E. Fitch and G. B. Dusenberre of the Ordnance Department; C. E. Hildreth, chief of the Machine Tool Section, and V. C. Kylberg, assistant chief of the Machine Tool Section. Guided by this chart, the person making the inventory also makes a conditional ap-

praisal, working in conjunction with three practical machine men at the plant, which shows the service value of the machinery. With this information the section will have a uniform method for arriving at selling prices from a price chart that is now in course of preparation.

"With the information arrived at through its inventory form and appraisal system, the section will be in a position to recommend sales policies and methods and proceed to the establishment of prices.

"Having fixed the price on the machinery, the section will then catalog it. As each tool is inventoried appraised and priced, it will be listed with each of the zone or district offices of the War Department, so that each of the sales offices will be in a position, whether the machinery desired is in its territory or elsewhere, to furnish to prospective purchasers complete information as to the number of each tool on hand at any time, their location, their condition and the prices asked by the Government."

Grinding Coke Samples for Analysis

Discussing a case of a contested analysis concerning the delivery of coke which different analysts reported to contain from 1 to 5.60 per cent ash, J. Hughes in *The Gas World*, Feb. 1, 1919, a British paper, suggested that, when the coke is ground with the aid of an iron pestle and mortar, it would become contaminated with iron, whereas the coke, crushed to small fragments while confined in a strong linen bag and then ground in an agate mortar, would not be contaminated. Treating samples of the same coke by the two methods he found 4 per cent and 1 per cent of ash respectively. In the former case iron could be picked out of the coke by a magnet.

Following the problem up, A. E. Findley, of the University of Sheffield (*Journal Society of Chemical Industry*, April 15, 1919) observed that all coke samples ground in an iron mill were magnetic. From one sample with 35.4 per cent of ash, 12 per cent could be separated with a magnet, and they yielded 67 per cent of ash, while the other part yielded 27 per cent; the coke itself was probably magnetic owing to the reduction of pyrites during coking. A clean coal with 1.55 per cent ash was coked in a platinum crucible and then ground up partly in agate, partly in iron; the ashes found were 1.7 per cent and 1.9 per cent respectively. This coke was soft. But in various other samples of hard coke grinding in agate or in iron hardly affected the ash percentage either. In a Durham coal, grinding in iron raised the ash percentage from 7 to 8.4, and grinding in hardware from 7 to 8.5; in the former case the ash increase was due to iron oxide of which 3 per cent (instead of 1.9 per cent in the agate-ground coke) were found; in the second case other impurities were taken up from the hardware.

Mr. Findley therefore concludes that the abrasion leading to an increase in ash takes place chiefly during the reduction of the pieces of coke to coarse powder, and that the subsequent grinding, whether effected in an iron mortar or in an agate mortar, has little or no influence. The distintegration in linen bags might itself cause contamination, but scarcely of any importance.

Henry Potts & Co., 650 Real Estate Trust Building, Philadelphia, who have been engaged in the iron and steel brokerage business for many years, have started a fully equipped scrap yard at Coatesville, Pa., which will be in charge of Charles J. Stott, formerly superintendent of the Valley and Visduet mills of the Worth Brothers Co. and the Midvale Steel & Ordnance Co. John K. Briggs is president of the company and Mr. Stott is vice-president.

The United States Tariff Commission has completed the collection of information concerning the graphite mining industry to be furnished to Congress when the proposed revision of the tariff is undertaken. Graphite has been on the free list under the name of "plumbago" since 1872. From 1846 to 1872 there was a duty ranging from 20 per cent to \$10 a ton on the article as plumbago or black lead.

Iron and Steel Prices During the War

Fluctuations of Metal Group Greater than those of Other Commodities—Trend in the United States Contrasted with Conditions in Other Countries

WASHINGTON, June 17.—Metal prices, especially those of iron and steel, showed far greater fluctuations during the war than those of any other commodity, according to the "International Price Comparisons" which have just been issued by the Department of Commerce. An elaborate chart of the comparative iron and steel prices in England and the United States shows that the latter rose much higher than the former, due to greater government control.

The bulletin on price comparisons was prepared by the Department of Commerce, in co-operation with the remaining representatives of the War Industries, and largely from the records of the latter. The document is accompanied by a careful record of all the prices used in the various comparisons, including those of the foreign countries listed. The comparisons are made on the basis of index numbers, each "weighted" to correspond with its importance. In making the index numbers for the various American industries, for instance, the monthly price of each commodity was multiplied by the quantity produced in or imported into the United States in 1917. It was found impossible, however, adequately to pursue this policy in dealing with foreign statistics.

The steady increase in prices in the United States since the beginning of 1916, after a relatively unfluctuating period in 1913, 1914, and 1915, is shown in the accompanying table "A" of index numbers (base, average prices July, 1913, to June, 1914=100).

Table A.—Range of Prices in the United States, 1913-1918

	Series of Quotations						
	1913	1914	1915	1916	1917	1918	
All commodities	101	99	102	126	175	194	
Food group	99	101	102	118	162	186	
Clothing group	101	96	97	125	177	227	
Rubber, paper and fibers...	106	98	91	114	145	160	
Metals group	110	93	108	174	262	211	
Fuels group	101	95	89	112	158	196	
Building materials group...	103	98	96	114	148	179	
Chemicals group	102	101	145	179	176	189	
Products used for food....	99	101	100	115	159	184	
Products used for clothing..	101	98	99	121	169	223	
Products used for building..	104	97	98	127	168	188	

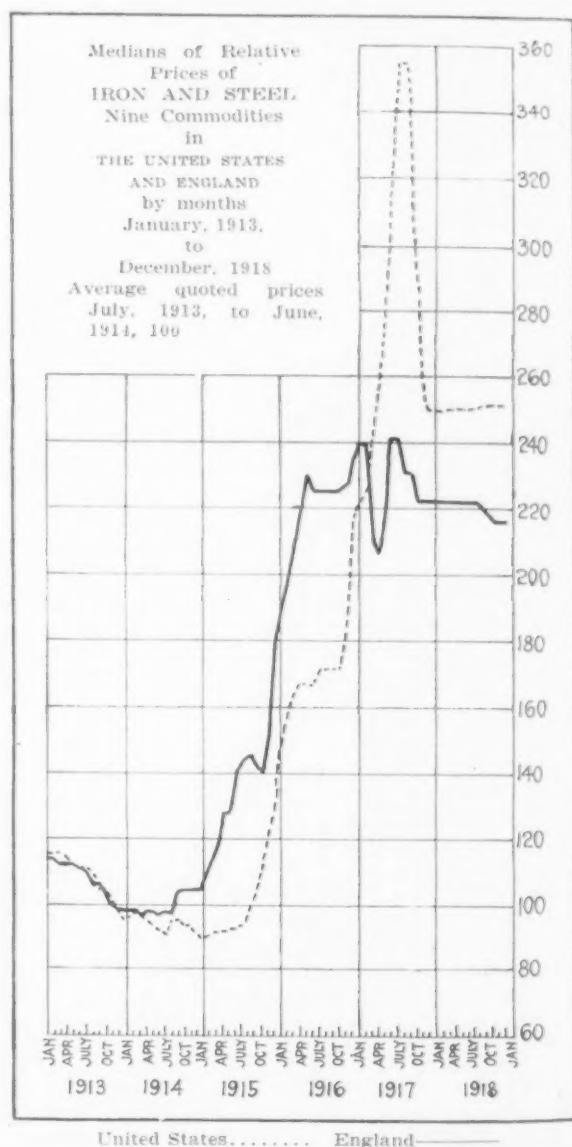
"The sustained rise of prices," says the report, "did not begin in the United States until the autumn of 1915, more than a year after the war began in Europe. Once started the rise was extraordinarily rapid. By August, 1916, the prices stood 25 per cent above the prewar level, by February, 1917, 50 per cent; by May, 1917, 75 per cent; and by September, 1918, 100 per cent above it. The periods of most rapid rise came in the winter of 1915-16, when European war orders began to have a pronounced effect upon American business; the autumn of 1916, when steel prices shot up at an extraordinary rate; and above all, the spring of 1917, when the United States entered the war.

"This last and greatest advance was cut short after July, 1917, and for a full year the price level was kept fairly stable. Business conditions and the huge war orders which the government was placing favored a further advance of prices. It is difficult to explain the checking of the rise on any other ground than the substantial success of the government's efforts to control prices through the Food and Fuel Administration, the purchasing bureaus of the War and Navy department, and the Price Fixing Committee of the War Industries Board. The price level began to move up again, though much more slowly than before in the last half of 1918. The end of the fighting in November, did not produce an immediate recession of the price level as a whole. Though many individual commodities declined, the index number of "all commodities" advanced in December to 203, the highest point attained in the six years covered.

"The great rise in metal prices is explained by the enormous demands made by the war for all sorts of steel, copper and other metallic goods. Ammunition, rifles, cannon, motor trucks, ships and a thousand other things, big and little, made largely from metals were required in enormous quantities."

The accompanying chart shows graphically the greater increase in the iron and steel prices in the United States in 1917 and 1918 than in England.

Table B covers nine identical iron and steel items. The following table shows the relation of the index



numbers, for wholesale iron and steel prices, by quarters and months, as well as years, and emphasizes in the similarity of the prices for the first two years, 1913 and 1914; the higher prices in England in 1915 and 1916, and the jump in the American prices in 1917 and 1918.

"The divergencies in metals are very striking," says the report, in commenting on the comparisons between England and the United States. "The English rise in 1915 and 1916 was earlier and more violent than the American, though the latter was exceedingly rapid. In 1917, however, the British practically subsidized the iron and steel trades as part of their war policy. Prices dropped suddenly, shot up again to their old

Molding and Pouring Large Cast-Iron Dissolving Tanks

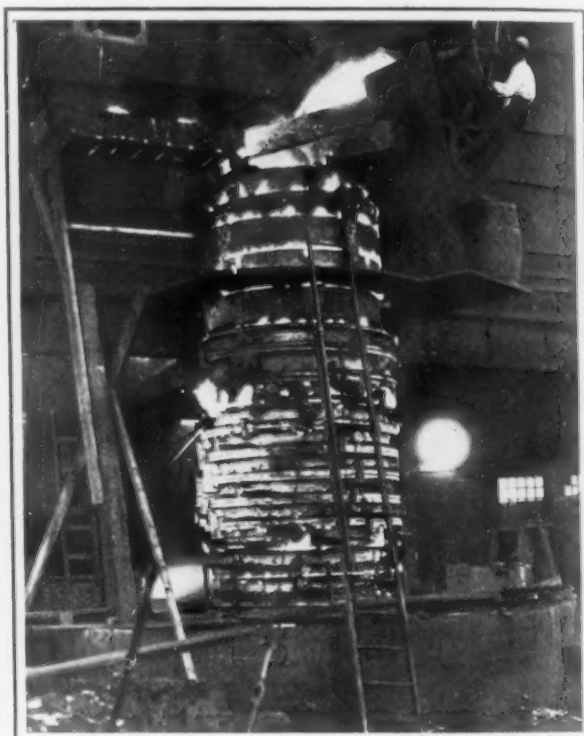
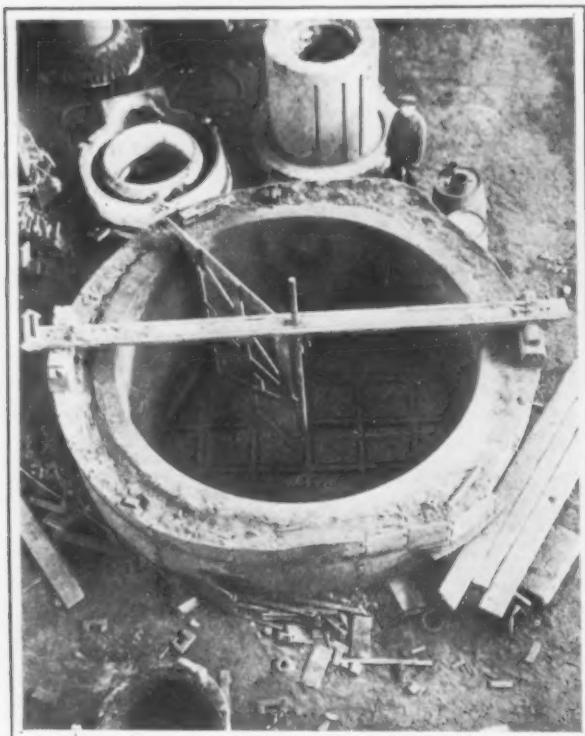
Industrial chemistry is demanding larger and larger equipment constantly. A recent example is afforded by the following account of the molding and pouring of large cast-iron dissolving tanks by the Buffalo Foundry & Machine Co., Buffalo, N. Y.

One illustration shows the mold for a 14-ft. 4-in. tank as it is being prepared, showing the sweep for shaping the cylindrical walls and the pattern-shaped ribs in the bottom. The depth of this casting is about 9 ft. As molten iron has a fluid pressure about seven times as great as water, the need for a deep pit casting is evident. The ground is well vented with cinder

having an average weight of 8 lb., the thickest part being 1 in. and the ring opening more than 4 in. Two tests were made, one with 1048 lb. of metal and the other with 1360 lb. It was found that there was considerable economy with the larger batch.

The metal was placed in the furnace at 60 deg. Fahr. and brought to 1560 deg. Fahr. in 35 min. The heat was held until the total elapsed time for the charge was 1½ hr., and the metal was then raked out. The saturation period was thus a little less than 1 hr. The average time to bring the charge to heat with oil was 39 min., and a trifle over 35 min. with gas. The second run with a larger batch required 38½ min.

The heat required per pound of metal with gas was found to be 788 B.t.u., with oil 1247 B.t.u. This gave an efficiency with the oil of 14.1 per cent, and with gas



Pit Mold for Large Cast-Iron Dissolving Tanks and the Method of Pouring Them Involving the Use of a High Riser

bedding and pipes. The walls of the finished mold are torch baked and finished off similarly to the core surfaces.

After the core has been properly centered and weighted, the mold is ready for the metal. The channel for the inflow is connected with the base of the mold and in this way a minimum amount of abrasion of the earth walls is assured. Another illustration shows a 35-ton ladle of cast iron being poured into the extra high riser. This is said to be a special feature with these castings and produces them under great liquid head pressure as well as furnishing large risers in which most of the entrapped sand, gas, etc., is segregated and removed.

Silicon irons are used where resistance to acids is involved in the use of these tanks. Two types of cupolas are used by this company, but there is also an air furnace in which 800,000 cu. ft. of air is used per hour, consuming about seven tons of coke and producing 27 tons of molten iron.

Fuel Oil or Producer Gas for Heat Treatment

A comparative test of fuel oil and producer gas for heat treatment purposes was recently conducted by the Ford Motor Co., Detroit. This company's producer gas plant furnishes twelve and one-half million feet per day for heat treating purposes, and more than this quantity is used at the same time for power purposes.

The test was made on a furnace of the common underfired type. The oil used had a heat value of 18,000 B.t.u. per lb., or 140,045 per gal. The material under treatment was steel gear blanks in a flat ring,

22.3 per cent. For saturation the heat required per pound of metal with gas was 533 B.t.u., and with oil 948 B.t.u. On the second run with 1360 lb. of stock a heating efficiency with gas of 26 per cent was obtained.

The General Steel Products Co., Detroit, has contracted with the Greer Steel Co., manufacturer of cold rolled strip steel, Dover, Ohio, to act as its district representatives for Michigan and Northern Ohio. The former company also represents in the same territory the Hoosier Rolling Mill Co., Terre Haute, Ind., manufacturer of hot rolled bars, reinforcing bars, structural steel and light rails. The company is composed of Herbert Appleby, A. L. Tushbant and John H. Miles, with offices at 1625 Dime Bank Building, Detroit.

The United States Civil Service Commission announces an open competitive examination for laboratory assistant, male, to fill vacancies at the Navy Yard, Washington, at salaries ranging from \$4.48 to \$5.92 per day. Applicants should apply for form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington.

The Minerva Foundry & Machine Co., Minerva, Ohio, has completed a new foundry and machine shop and will start operations soon. The company will specialize in gray iron, semi-steel and chilled castings up to 3000 lb. and general jobbing machine work. J. B. Temple, president of the company, has had 20 years experience in foundry work.

Drop Forge Association at Pittsburgh

Technical and Commercial Subjects Pertinent to the Industry Considered at Large Meeting—All Officers Retain their Places

WITH over 350 members and guests in attendance the sixth annual convention of the American Drop Forge Association was held at the William Penn Hotel, Pittsburgh, June 12-14. Both commercial and technical subjects were considered at sessions held on the first two days of the gathering. President E. J. Frost, of the Frost Gear & Forge Co., Jackson, Mich., called the convention to order, after an address of welcome had been given by Mayor E. V. Babcock of Pittsburgh. Incidentally Mayor Babcock said Pittsburgh was practically free of Bolshevism; also that the city has equally few labor agitators and that labor conditions were satisfactory. The wage rate being high means very few unemployed. President Frost, in reviewing past and present conditions, said:

"In view of the tremendous increase in equipment to meet war needs, it undoubtedly would be to our advantage to study new avenues of outlet rather than to resort to ruthless cutting of prices to keep our men and hammers going. New industries are continually being started, and a campaign of education might reasonably be expected to bring worth-while returns from heretofore untouched sources."

Secretary A. W. Peterson reported that since the previous convention, fifteen new members had been admitted to the association, as follows: Armstrong Bros. Tool Co., Chicago; Baldwin Locomotive Works, Philadelphia; Bethlehem Steel Co., South Bethlehem, Pa.; Cadillac Motor Car Co., Detroit; Duff Mfg. Co., N. S., Pittsburgh; Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.; Heyl & Patterson, Inc., Pittsburgh; Horsburgh Forge Co., Cleveland; Joseph Dyson & Sons, Cleveland; Michigan Bolt & Nut Works, Detroit; Moline Forging & Mfg. Co., Moline, Ill.; Standard Forgings Co., Indiana Harbor, Ind.; Steel Car Forge Co., Pittsburgh; Vaughn & Bushnell Mfg. Co., Chicago; Walworth Mfg. Co., South Boston, Mass.

E. B. Horn, treasurer, reported the finances of the Association to be in a satisfactory condition.

The report of the standardization committee was presented by its chairman, R. T. Herdegen, of the Dominion Forge & Stamping Co., Walkerville, Ont., who stated that the limitations of standards, as used by different customers, varied a great deal, as a result of which a forging satisfactory to one consumer would not be so to another. Since the signing of the armistice his committee had taken up actively the work assigned to it, and had investigated the allowable limits for automobile crankshafts, gears, cam shafts, connecting rods and axles. On these the committee brought together the results of a questionnaire, in which forge men were asked for their view and practice. The work of the committee was summarized in a set of blueprints which were distributed. Mr. Herdegen suggested that the committee be allowed to continue its work over another year, as there are so many types of forgings to be considered and he believed good work could be done.

The report of the constitution committee, of which F. A. Ingalls, president Ingalls-Shepard Forging Co., Harvey, Ill., was chairman, stated that several makers of drop forgings were summoned to Washington by the War Policies Board last year, not to consider the best means of aiding the Government to win the war, as they supposed their mission to be, but to consider the adoption of an 8-hr. day. Mr. Ingalls spoke of the great service rendered the Government by the manufacturers of drop forgings, nearly every plant in the country having been engaged on war work from the time the country entered the war until the armistice was signed. He said it was the belief of the constitution committee that there should be a division in the membership, and that the association should be made up of active members and associate members. Entitled to

active membership should be any person, firm or corporation whose principal business is the manufacture and selling of forgings. Associate membership should consist of any person, firm or corporation, making drop forgings to be used in their regular line of manufacture, and who do not manufacture drop forgings for sale as such.

Use of Powdered Coal Explained

At the second session, held Thursday, W. O. Renkin, manager engineering department, Quigley Furnace Specialties Co., New York, presented a paper on "Development in the Use of Powdered Coal in the Forging Industry." In part it was as follows:

"The principal requirement of a furnace to successfully burn powdered coal is a relatively large combustion chamber of proper design. This is necessary to allow the particles of coal to properly mix with sufficient air, at very low velocity, to insure perfect combustion. In very small heating and forge furnaces this result is obtained by means of opposing burners, or by having the secondary or combustion air jet opposed to the coal supply.

"For increased production and reduced fuel consumption in large ingot heating or forge furnaces, it has been found advisable to change from regenerative type to straight reverberatory type furnaces. In actual practice a fuel consumption of 250 lb. of powdered coal per ton of 12 or 14-in. ingots heated, including all standby losses, is being secured, and no doubt this can be reduced to approximately 200 lb. by further modification in furnace construction.

"On furnaces heating ingots up to 36-in. diameter the fuel required per ton has been found to be about 550 lb. By careful supervision this was reduced to 400 lb. and by further changes in furnace design it can be still further reduced. Any furnace that is being successfully fired by hand with bituminous coal can be economically powdered-coal fired with practically no change in design. This statement has been questioned, but I feel justified in repeating it because the quantity of excess air and the fuel consumed in hand firing is greater than when using powdered coal; so that if the combustion chamber is sufficiently large for hand firing, it is overlarge for powdered coal firing."

Mr. Renkin referred to the several systems of distributing and burning prepared coal, particularly the air flotation and bin storage systems, and said:

"In the compressed air transport system the powdered coal is first put into a blowing tank and then compressed air is turned in until the whole blowing tank is under the pressure necessary to start the coal. Next the valve in the transport line is opened and the coal starts moving through the small line, not as a mixture, but as alternate slugs or pistons of coal and air.

"The quantity of compressed air required to transport one ton of coal varies from 600 to 1500 cu. ft. As this is only from 1/500 to 1/200 of the air necessary for combustion there is no danger of fire in this method. The transport line is made of standard wrought pipe and therefore is easy to install and keep tight (a 2½-in. wrought pipe will conveniently carry about 6 tons of powdered coal per hr. and a 4-in. pipe will handle about 20 tons per hr.)."

Charles Longenecker, the Bonnot Co., Canton, Ohio, contributed also to the subject of powdered coal in the forge shop. In part, he said:

"In one forging plant burning powdered coal the saving in fuel is 60 per cent, while in another the cost of powdered coal per 100 lb. is approximately 23c., which figure includes all costs delivered to the burners. The average fuel consumption for two months on forge furnaces such as are used for drop forgings was 96 lb. per hr. per furnace. This gives an hourly

cost of 22c. per furnace. Using these figures and assuming an output of 2800 lb. of steel in 10 hr., the cost would be \$2.20, or \$0.07% per 100 lb. of steel heated. These figures are taken from actual practice, but must be considered in the light of present high labor and supply costs. In normal times these costs would be materially reduced.

Small Furnaces Present Difficulties

"I say of the small drop-forge furnace, without fear of contradiction, that there is no other type which presents so many difficulties in securing proper control and economy as are encountered in these furnaces. These conditions are bound to exist where a high temperature must be maintained in a small heating chamber. In applying powdered coal it was necessary to so co-ordinate the different variables, such as design of furnace, location of burners and size of opening, that the greatest efficiency would be obtained. In some cases this meant altering the furnace construction, while in other cases it simply required a change of burners.

"The disposal of the waste gases was another feature which required considerable study and experimenting before the correct solution was found. The control of very hot gases moving at a high velocity is in all cases difficult, and especially so when the comfort of the furnace operator is of prime importance, as on this depends very largely the efficiency of the unit. These gases are now being removed by stacks on the larger furnaces and hoods and stacks on the smaller ones.

"One development which has been instrumental in opening up a larger field for the fuel under discussion is the use of substations fed from a central source. This improvement finds its field in large plants where the departments to be supplied are widely separated. Sometimes it is desirable to locate the main station for preparing the coal at a point convenient to a railroad siding rather than close to the building in which the coal is to be burned. The principle involved is the conveyance of the fine coal through pipes by means of compressed air. This is put into practice by filling a tank with approximately four tons of pulverized coal and then forcing it through a 3-in. pipe with compressed air at about 35 lb. gauge pressure. From the substations the pulverized coal is delivered to the furnaces through spiral riveted pipes."

Producer Gas as a Fuel

Producer Gas as a Forge Shop Fuel was the topic of a paper by Earl E. Adams, Smith Gas Engineering Co., Dayton, Ohio. He said in part:

"We are at the present time annealing, case hardening and tempering steels for a great many different purposes in furnaces, the hearths of which vary from 18 x 24 in. to 6 x 6 ft. and larger. In almost every case these furnaces are of a standard make, and were originally fired with either fuel oil or natural gas. The application of producer gas was accomplished by a change of burners sometimes with induced air and other times with air under pressure of 6 to 8-in. water column. The gas was delivered at 8 to 10-in. water pressure, and often as high as 1 lb., the producer equipment being so arranged as to vary the pressure at the plant to suit the furnace demands.

That the efficiency of the ordinary furnace may be increased by the application of producer gas is shown in the data taken from a recent test. The furnace is the common underfired type, outside dimensions 7 ft. 10 in. wide, 7 ft. deep, and 6 ft. high with 9-in. walls. The bottom is divided crossways by a 9-in. wall, making two combustion chambers. At each end of the combustion chamber a fuel oil burner of standard type was installed. This burner when using gas was replaced with a special producer gas burner of the induction type. When the furnace was oil fired no vents other than leakage about doors seemed necessary. When producer gas was used four holes, 4½ x 2½-in. were made in arch to relieve the pressure. The oil used was a western variety, B.t.u. value 18,000 per lb., or 140,000 per gal. The oil pressure was 40 lb. per sq. in. The air pressure 27-in. water column. Temperature of oil as it entered burner 67 deg. F., air 79 deg. F. When

gas was used temperature was 109 deg. F., B.t.u. value 165 per cu. ft. gas pressure, 1.9-in. mercury. secondary air, none. Details of measurement were carried out with great care. Six consecutive runs were made so that error in the cycle would show in results. The difference between any two runs was less than 0.6 of 1 per cent. Continuous gas samples were taken. The cycle started by charging the furnace with 1048 lb. of steel gear blanks, and bringing furnace temperature to 1560 deg., requiring 35 to 40 min. Heat was held for a total elapsed time of 1½ hr.

The following average figures were obtained:

	Heating	Saturation
Oil, 9½ gal.	1,307,087 B.t.u.	7,169 gal. 1,004,116 B.t.u.
Gas 825,825 B.t.u.		559,300 B.t.u.
B.t.u. per lb.—		
Oil	1,247	948
Gas	788	544

In round figures the efficiency of the furnace when fired with oil was 14 per cent and 22 per cent with producer gas. Later 1360 lb. of stock was charged and the furnace efficiency with gas was increased to 26 per cent.

Takes Optimistic View of Future

The meeting turned its attention from technical matters when F. A. Ingalls, Ingalls-Shepard Forging Co., Harvey, Ill., spoke on the topic "Forge Shop Profits." After referring to the high cost of living and the high cost of production, he made this optimistic statement:

"There is no occasion for panic-like impatience. The business situation in our country is fundamentally sound, a bountiful crop seems assured, there has been no inflation of credits, the purchasing power of the people is greater than ever before, and the situation demands from the manufacturer caution and the exercise of good judgment, for prosperity is just ahead of us, unless by our own acts we push it further away.

"If it has happened, during the past three years, by reason of the intense demand for drop forgings to supply commercial requirements, as well as the needs of the Government, that manufacturers have obtained abnormally high prices, it is very evident that such prices cannot be continued. What we need to guard against is demoralization in price-making in changing from a high level of a demand to a demand that is insufficient to keep the equipment of the country in operation and to aim at the stability which should prevail in normal business.

"We term a business normal that is operating on regular time, but not so crowded that additional orders could not be executed or needed repairs regularly attended to.

"The term 'waste' has gained a new significance. At present the sentiment of the country indicates that owing to our experience in the war an immense step has been made to avoid conditions which result in unremunerative compensation for labor, also for the wasting of raw material without a profit. We are gaining the idea that it has not been good economy to waste the raw material of the country and as the production of coal, oil, iron ore, cutting of timber stumpage and the like, reduces the world's capital, this production should be limited by a demand that affords a profit. The omission of profit is waste.

"The idea of what may be termed 'well being' in the living conditions of our workmen is having new consideration, and it is accepted that if a man's daily toil yields nothing but the bare necessities of existence there has been a waste of part of his effort.

"Business energy which unites with capital in an industrial undertaking is wasted if an adequate profit is not secured. In the making of prices on our product in this period of business uncertainty probably more painstaking is required that in the long run the result to us is not wasteful and as the people who control our raw material seems to be able to protect their own, and as labor must be safeguarded, it becomes of importance to us to determine what shall be done with our business energy."

Question Box for Trade Topics

Thursday's proceedings were brought to a close with a "question box," at which there was brief discussion

of several trade problems, but no formal conclusions were reached. The questions included the wisdom of gratifying requests as to the sizes of stock used in making forgings, the weight of the material required to make a forging, etc. Also discussed was the practice with regard to assessing hammermen for spoiled work, and the length of time which customers' dies are stored after the last run of forgings. One member stated:

"A few years ago we had a number of dies that we wanted to get rid of and the owners would not answer our requests in a good many instances. We sought legal advice and found that we were absolutely responsible for the dies. From that time on we started a system that dies were not to be held after three years from the date of the last order. We have some dies that we have had 25 years, and we are still liable to have to rework if anybody should want a forging."

At the Friday morning session the first paper presented was entitled "Sand Blasting Versus Pickling," by R. R. Shuman, of Chicago. Mr. Shuman gave a very exhaustive talk on the development of the sand-blasting methods used in foundries. He showed lantern slides of installations of abrasive equipment for cleaning castings installed in different parts of the country.

Colonel Bope on the Outlook

At the afternoon session Col. H. P. Bope, formerly general manager of sales of the Carnegie Steel Co., Pittsburgh, gave a talk on "The Iron and Steel Situation, with Special Reference to the Forging Industry." Some of the points brought out in Col. Bope's address were as follows:

"The league of nations, if put through in any kind of form, will have a wonderful effect on business.

"The United States will not be called upon, to any great extent, to furnish materials for reconstruction in European countries.

"England will be the greatest competitor of the United States in the future and will do much to rehabilitate France and Belgium.

"There will be no change in the labor situation, in so far as wages are concerned, for many years to come.

"The American business man will go ahead and create an era of prosperity that has never been equaled and the United States will retain its place as the world's greatest manufacturing, financial and commercial nation."

H. V. Schoepflin, Westinghouse Electric & Mfg. Co., gave a talk, with lantern slides, showing the development of the low pressure steam turbine. Views were shown of turbine installations in forge plants all over the country. The discussion was in the hands of F. B.

Allen, of the Baker-Dunbar-Alan Co., Pittsburgh, Pa.

A carefully prepared illustrated paper on "Fusion Welding as Applied to Drop Forgings," was presented by S. W. Miller, Rochester Welding Works, Rochester, N. Y. The paper which will appear in a later issue of THE IRON AGE, concluded with the statement that there are many forgings to which fusion welding processes can be applied with perfect safety, and that probably they could be profitably extended beyond their present application.

Question of Die Cost

A paper on "Die Cost as a Factor in Selling Forgings" was presented by R. T. Herdegen, Dominion Forge & Stamping Co., Walkerville, Ont. He began by saying there probably was no subject connected with the drop forge industry that receives more attention from a sales or cost point of view than that of die costs and charges. He suggested that the association adopt some standard method of charging initially for dies. In concluding, he said the original die charge should always be made on the acceptance of an order for new forgings, that the charge should be equal to the labor and material used in making the dies, and that a customer should be permitted to remove dies from a shop only on payment of the original charge.

L. K. Wilson, Timken-Detroit Axle Co., Detroit, described in some detail the bonus system which his company had established two years ago, and which had produced satisfactory results. Briefly the plan was based on two principal factors, production and costs, the unit being the cost per pound for which a standard cost has been determined, and it is on the relation of actual cost to the standard cost that bonus is paid. If the actual cost exceeds the standard cost, but little bonus is paid. If the actual cost is less or equal to the standard cost then considerable bonus is paid.

In a paper entitled "Heat Treating Problems That Originate in the Forge Shop," W. C. Peterson, Packard Motor Car Co., Detroit, told of some of the faults frequently disclosed in machining and of the desirability of uniformity in product. Summarizing his points, he said: "Standardization of operation in forging, application of the correct kind of flame and clean forgings make for an ultimately better product."

At the annual election, held at the last session, all officers and retiring directors were re-elected. The place of the next meeting was left to the executive committee. The association has nearly 500 active members. On Saturday many industrial plants were visited. The convention was the most successful yet held in the life of the association.

Will Build Sheet Mill in Baltimore

BALTIMORE, June 17.—The Eastern Rolling Mill Co., will be incorporated in Baltimore and a large plant established in that city for the manufacture of high-grade steel sheets to be used in the construction of automobiles, metallic furniture, enamelware, stoves, etc. The subject has been contemplated for some time but announcement of plans has just been made by those interested.

J. M. Jones, formerly vice-president and general manager of the Massillon Rolling Mill Co., Massillon, Ohio, and more recently general manager of the sheet and tinplate plant of the Bethlehem Steel Corporation, will be the president of the new company.

There are at present, it is stated, no mills east of the Pittsburgh district manufacturing for the general market the kind and quality of sheets to be produced by the company, and it is estimated that the consumption in the Eastern territory alone is five or six times the capacity of the proposed plant.

It has been officially announced that among those who will be upon the board of directors will be J. E. Aldred, Aldred & Co., New York; Frank B. Cahn, Baltimore; Charles E. F. Clarke, president Pennsylvania Water & Power Co., New York; John H. Hill, R. C. Hoffman & Co., Baltimore; J. M. Jones; Waldo Newcomer, president National Exchange Bank, Bal-

timore; C. C. Pusey, secretary Industrial Corporation, Baltimore; John T. Stone, president Maryland Casualty Co., Baltimore, and A. W. Thompson, president Philadelphia Co., Pittsburgh.

The terms of the financing have not yet been announced, but it is stated that the company will be incorporated in Maryland and will offer an 8 per cent cumulative preferred stock.

New Plants in the Central West

Active construction on a \$25,000,000 plant for the National Tube Co. at Gary, Ind., will begin in July. The first unit will consist of four blast furnaces, three Bessemer converters, blooming, skelp, plate and tube mills. The site of the plant is 800 acres on the shore of Lake Michigan east of Gary harbor.

The National Enameling & Stamping Co., St. Louis, is offering \$1,435,400 of treasury preferred stock to its common and preferred shareholders and will use the proceeds to finance the St. Louis Coke & Chemical Co., which proposes to erect a 500-ton blast furnace and a by-product coke plant at Granite City, Ill., as has been announced in THE IRON AGE.

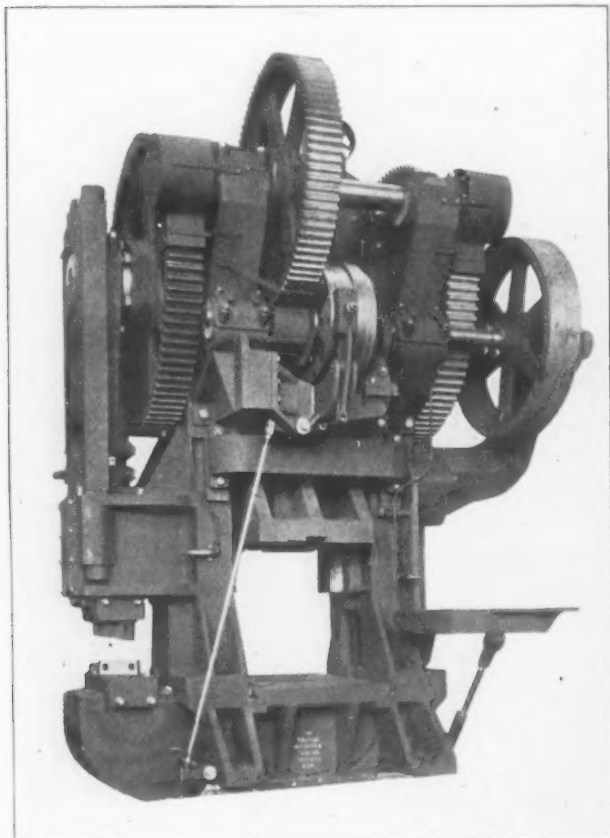
The Federal Machinery Sales Co., Chicago, has been given the exclusive agency for the G. A. Gray Co., Cincinnati, in the Chicago and Milwaukee districts.

A Large Trimming Press

The large single crank trimming press illustrated weighs approximately 185,000 lb. and embodies in its construction features which are unique on account of the unusual size of the machine, and also because it is operated by twin gears on the main shaft. The frame consists of a base, two uprights and a crown held together by four steel tie bolts of large diameter which are heated and shrunk into place. These four rods take the stress. The uprights are made heavy to withstand any lateral stress which might occur when the slide is unevenly loaded.

Particular attention is called to the design of the outer shearing off slide. This slide is operated by an eccentric shaft which extends through the bearing in an auxiliary housing secured to the outside slide housing by steel tie rods.

The method of supporting the clutch shaft by a specially designed bracket, bolted to the frame, is em-



This Trimming Press Weighs 185,000 Lb. and Is Operated by Twin Gears. An outboard bearing is eliminated by supporting the chuck shaft on a specially designed bracket

phasized as affording compactness and rigidity and doing away with an outboard bearing, allowing a free space around the press for ready access and for the handling of material. The press is fitted with a power slide elevator. Lubrication is by a forced feed system which permits the operator to lubricate all of the important bearings from the floor. The press has a stroke of 16 in. and slide flange 68 x 40 in. The area of the bed is 72 x 48 in. The gear ratio is 44 to 1 and will make seven strokes per min. The machine is used for trimming 12-cylinder aeroplane crankshaft forgings and other similar heavy work from hammers as large as 15,000 lb.

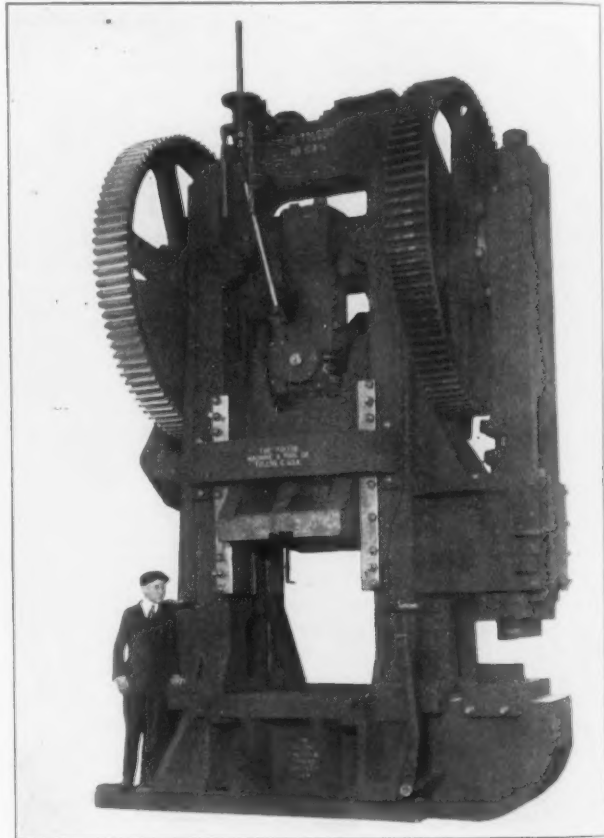
The press was built by the Toledo Machine & Tool Co., Toledo, Ohio.

The J. W. Sanders Co., also known as Sanders, Keller & Co., 30 Church Street, New York, and 1202 Crozer Building, Philadelphia, are now exclusive district representatives for the Crosby Co. of Buffalo, manufacturer of pressed and drawn sheet metal parts, and the Elliott Blair Steel Co., New Castle, Pa., manufacturer of cold-rolled strip steel.

Combined Gas and Steam Engine

An internal combustion engine designed to utilize the waste heat of combustion was recently described in a paper presented before the Royal Society of Arts, London, by Captain F. E. D. Acland, according to *Engineering*. The engine was developed by W. J. Still, and represents an attempt both to improve the efficiency of the internal-combustion engine and to eliminate some of its undesirable characteristics.

The cylinder of the internal combustion engine is jacketed with hot water at constant temperature. Heat abstracted from the combustion cylinder is employed not in raising the temperature of the jacket water, but in converting it into steam. The jacket is connected up to the water space of a steam boiler and this water, on its journey to the jacket, is taken through a tubular heater through which the exhaust gases pass. The steam and water leaving the jacket are led to the steam space of the same boiler. The exhaust gases, on leaving



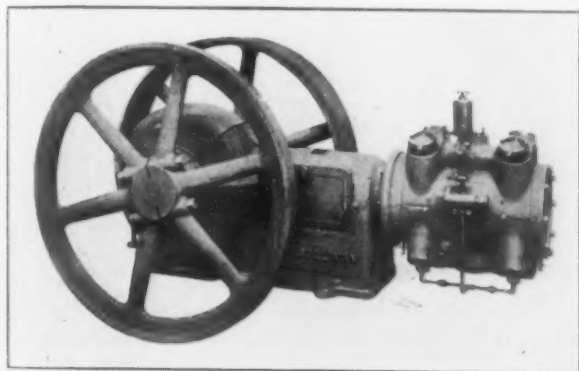
the tubular heater are taken through a second heater, through which the feed water is drawn. The steam from the boiler is used in a steam cylinder which forms the underside of the combustion cylinder. That is to say, there is but one piston and one cylinder, the upper part of which is an internal-combustion cylinder and the lower part of which is a steam cylinder. The down stroke is an internal-combustion stroke, and the up stroke a steam stroke. Considerable economy in operation is claimed.

The Electric Furnace Co., Alliance, Ohio, has just shipped a standard nose tilting type furnace to the Navy Yard at Washington to be used in the Government brass foundry in that city. This furnace is provided with a motor-operated tilting mechanism and has a maximum hearth capacity of 2000 lb. The shell is 7 ft. in diameter and the furnace is rated at 105 kw. capacity.

Doehler Topics, a monthly publication, of the Doehler Die-Casting Co., Brooklyn plant, has issued its initial number, covering plant activities especially developments regarding the new employees association, modeled along the lines of industrial democracy.

Wafer Air Compressor Valves

A plate, or wafer valve, has been perfected at the Claremont, N. H., works of the Sullivan Machinery Co., and is now being applied to that company's single stage belt-driven compressor, type WG-6, and the corresponding steam-driven type, WA-6. The wafer valves seat in cages arranged radially to the axis of the cylinder and close to the two ends of the cylinder, the inlet valves being situated at the bottom and discharge valves at the top. The valves are held to their seats by flat annular steel springs. Their operation is alternate according to the position of the piston; under pressure, the spring flattens and permits the valve to open, whereas it resumes its normal position when the pressure is removed, thereby closing the valve. The spring rests between the valve and a guard plate designed to give a wide port opening with a minimum

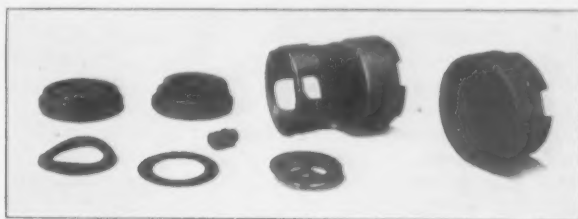


Sullivan Air Compressor. On the top and bottom of the air cylinder will be observed the valve screw plug, the pilot valve being on the side. Top picture at the right shows the air inlet valve. Displayed is the unloading piston, valve assembled, cage, screw plug, guard plate, spring and valve. Lower picture at right shows the discharge valve parts—valve seat, spring, guard plate and seat assembled.

New Broaching Machine Announced

The American Broach & Machine Co., Ann Arbor, Mich., announces a new broaching machine with single belt which drives through a steel drive pinion and idler gears. The main drive gear is internal, a feature pointed out as giving a balanced effect and as relieving the gear teeth of delivering the entire load.

Other features emphasized are as follows: All gears are encased and do not run when the machine is on the reverse stroke; the return stroke is made at high speed; the nut is removable, regardless of the position of the screw, and without removing the screw; the roller thrust bearing and nut are in a compartment by themselves and run in an oil bath thus to protect them from injury by gear grit and wearings; there is an internal gear drive with two intermediate gears and central driving pinion; the screw is of the buttress



of clearance volume, but without restricting the admission or discharge of the air to or from the cylinder.

The simplicity of the spring and its relatively short lift under compression permits the valve to rest closely to the bore of the cylinder, thus effecting a corresponding reduction in clearance losses. The small size and light weight of the valves, as well as the material of which they are constructed, insure long life, it is asserted, and make renewals inexpensive when they prove necessary. The question of repair stock is simplified because the valves, springs and guards used for both inlet and discharge are identical.

Multiples of relatively small valves are employed rather than one or two valves of large diameter, the large valves being objectionable because of the large clearance pockets required and the greater likelihood of noisy action and breakage.

Compressors equipped with these valves are unloaded in essentially the same manner as machines equipped with automatic poppet valves. There is an air pipe connection from the receiver which is controlled by a pilot valve at the side of the air cylinder. When the receiver pressure rises to the unloading limit, the pilot valve admits air pressure through branch pipes to small plunger pistons located in the valve plugs. The other end of the piston carries a three-pronged extension, which raises the inlet valve from its seat until the receiver pressure is reduced the required amount, following which the piston falls and the valve seats and the compressor resume operation. While the valve is raised and the unloader is in action, no air is compressed and the piston of the compressor simply carries the air at atmospheric pressure through the cylinder and open valves.

Wafer valves have been used successfully in high pressure compressors supplied the United States Navy for charging torpedoes at pressures as high as 2500 lb. per sq. in.

type thread locked to the sliding head by a square key and lock nut thus to allow for easy and positive assembling or taking down; there are no clutches, the machine being operated by a slight movement of the belt; the operating handle is of the ball control type; the front column of the machine has a finished face with two T slots for bolting fixtures, oil pan and support tables; the oil pump is of large size, driven direct from the countershaft, and always runs in one direction; a tool cupboard is in the base for keeping broaches and other accessories.

Conditions in the Chain Market

The larger chain manufacturers report plants fairly busy on back orders; but conditions vary a great deal with each particular line. The production of automobile tire grip chain goes on without much fluctuation. Makers of ship chain continue to be busy in keeping with the activity of the Emergency Fleet Corporation program. On some lines, such as chandelier chain, manufacturing is going forward with a few of the makers, although it is reported the trade was well supplied not long ago.

Current orders to the chain factories are probably less than 50 per cent of plant capacity, and no substantial increase is expected except as the general pace of business improves. Jobbers' stocks are far below normal, the trade adopting a policy of providing for only immediate needs while the probability remains that prices may go lower. The base price, \$6.50 per 100 lb., fixed April 1, still remains as the agreed price level, although eventually the list may be brought down on sizes over 1/4 in. The inability of the producers to maintain strict adherence to the accepted schedule makes quotations on attractive business largely nominal for the time being.

The Use of X-Rays in Metallurgy

British and French Research and Practical Results—Use in Analyzing Steel—Examination of Carbon Electrodes

CONSIDERABLE progress has been made in Great Britain and France in the examination of metals and materials with the X-ray. This subject was recently discussed at a joint meeting in London of the Faraday Society and the Roentgen Society, at which several papers by prominent investigators were read. An abstract of the papers and proceedings follows:

Work in France

Eugene Schneider, president of the Iron and Steel Institute, said that the apparatus used at the Creusot works was the standard type of plant manufactured by the firm of H. Pilon, who were the licensees for the Coolidge tube in France. The following was a summary of the results obtained since the plant was installed:

- Researches into segregation and blowholes.
- Influence of aluminum on cast steel.
- Examination of steels containing different percentages of tungsten.
- Examination of compound metals.

The method was first of all applied to the investigation of blowholes in cast steel. Steel plates (railroad fishplates 23 mm., or 29/32 in., thick) were cast in sand molds without any special precaution being taken. The photographs showed a number of white spots, each of which represented a blowhole. Two fishplates exhibited very different forms of blowholes. In one they were near the surface and stretched out in a direction perpendicular to the walls of the mold. In the other the blowholes were central and very large in volume. Radiographs were also taken of two fishplates made at the same time as the others, with steel from the same cast, in molds made from the same sand and dried under the same conditions. But at the moment of casting the plates, 37.5 g. of aluminum for each kilogramme of steel was added in the case of one, and 75 g. per 100 kg. weight of steel in the case of the other. The two photographs showed a diminution in the number and size of the blowholes when the quantity of aluminum added on casting was increased, and also showed clearly the action of this metal in deoxidizing the molten steel. By radiographing test pieces containing increasing quantities of aluminum it should thus be possible to determine, for a given casting, the minimum quantity of aluminum to be added to eliminate central blowholes.

In the case of a cast-steel bracket of a gun wagon, the radiograph showed a clearly defined blowhole which compromised the solidity and strength of the bracket. This blowhole was due to defective casting. By changing the method of casting, brackets were obtained in which this blowhole was not present.

When a steel casting was made, and it was desired to ascertain whether blowholes formed in the metal when cold, a small piece of extra metal about 20 to 30 mm. thick was cast in one with the main casting, this extra piece being examined under the X-rays. When a new casting was being made in which, owing to the method of casting adopted, there was reason to suspect the existence of a defect at a particular point, this particular part was radiographed to ascertain whether the metal was sound. This might lead to a change being made in the method of casting. Unfortunately, there were limitations to this method, owing to the lack of penetration of the X-rays. It was not possible to penetrate a thickness of more than 45 mm. of ordinary steel, and even for this thickness the time of exposure was considerable.

Analyzing Tungsten Steel by X-Rays

As regards tool steel, when the percentage of tungsten (which is of high atomic weight, 182) was

high, the plates were not so permeable to the X-rays as when this percentage was low. When suitable illumination was employed these differences showed up much more clearly on the negatives than on the positives. Thus three carbon steels, containing 0.6, 0.9 and 1.15 per cent carbon respectively, gave a radiograph in which were clearly observable the differences in opacity corresponding to these percentages. It would appear possible, then, to apply radiography for the purpose of a rapid analysis in particular cases. If, for instance, carbon steel bars had been mixed up inadvertently with tungsten steel bars, they could be sorted out speedily by radiography.

In stating his conclusions, the author said that in the present state of our knowledge of X-rays and their production, the application of radiometallography enabled a visual examination to be made of ordinary steels, provided their thickness did not exceed 40 to 45 mm. This limiting thickness was reduced when the steel contained at least one constituent of higher atomic weight. It would be of inestimable value in metallurgy if ingots of 20 cm. (8 in.) thickness and upwards could be radiographed; but unfortunately we had not yet reached that stage.

X-Ray Examination and Steel Metallurgy

A contribution by Sir Robert Hadfield, S. A. Main and J. Brooksbank gave the following general summation:

The possibilities of X-ray examination in steel manufacture will be readily apparent. The means which it provides for enabling the metallurgist to see the interior of steel castings and forgings, and thus to diagnose and localize the diseases to which steel is subject, must prove of considerable benefit.

The chief difficulty hitherto has been the limited thickness of metal which could be penetrated, but considerable strides have been made within the last year or two in this direction. Thicknesses up to 4 in. are now said to have been successfully radiographed.

It is obvious that to be of service it must be possible to examine articles of a practical size; otherwise the chief advantage of such a method of examination is lost, namely, its non-destructive character. A few years ago, and even now with the larger articles, it was necessary in order to examine a casting to cut out a section to obtain a radiograph, thus destroying the article for practical purposes. While this served its purpose for research examination, it still left the wider application, that is, for inspection of articles intended for service, untouched. The advantages of applying the method to the routine examination of special steel castings and forgings in the course of their manufacture, to ensure their being thoroughly sound, will be at once apparent.

X-ray examination need not necessarily be confined to the steel products themselves, but also to materials used by the steel manufacturer; another application which suggests itself is the examination of welds.

The question of internal defects has always been a bugbear. In the case of an habitual tendency, such as the pipe in ingots, this usually reproduces itself under similar conditions of manufacture, and can be controlled by the cutting up and examination of an individual ingot out of a lot, this forming a criterion of the whole. Many of the defects met with are, however, of a casual nature, and the use of X-rays will help in these cases by individual examination and elimination of the defective articles.

Apart from the mere detection of defects, it is a distinct advantage to have these defects visualized to the eye, and the perspective view presented by a stereoscopic radiograph carries much more information to the mind as to the nature of the defect than the alternative

method of fracturing the article through the defect, which only presents a sectional view.

The routine operation of X-ray examination will be much facilitated if the necessity for photographing can be avoided; that is, if articles may be examined by the use of a fluorescent screen. This would very much increase the rate of examination and, after all, in inspection work, the majority of the articles are expected to be free from defects and, therefore, no permanent record is required. In those cases where a permanent record is required, the particular articles may, of course, be put on one side for the purpose.

A further point is that of expense. Present apparatus for the purpose is costly and delicate, and its operation of a rather expert nature to be applied to routine purposes.

It must be borne in mind that in the present state of the science, X-ray examination does not magnify defects, so that its utility is limited to those defects which are of a size within the visibility of the naked eye. Many of the defects in steel arise from microscopic causes, and these must still rely for their elucidation on the valuable work covered by micrography.

Quite apart from the question of defects in steel is the very valuable field in theoretical metallurgy, opened up by Prof. W. H. Bragg and followed with great ability by Prof. A. W. Hull, applied to the atomic and crystalline structure of metals. While this subject is rather a matter for the research laboratory, it should eventually give positive evidence on vexed questions concerned with the atomic structure, such, for example, as allotropy, on which, hitherto, it has only been possible to theorize.

A still further application is the analysis of steels. Chemical methods are so well established, and on the whole so satisfactory, that X-ray examination can hardly take their place. Still, the subject is one which may well be worked upon both for its own sake and the additional viewpoint which it provides as to the constitution of steels.

The X-Ray and Carbon Electrodes

Sir Robert Hadfield, in a contribution under this heading, said that, in view of the trouble experienced with electrodes in electric steel furnaces, due to various causes, but principally to fracture in use or in handling, it was thought radiographic examination might help to show internal causes accounting for their behavior. These electrodes varied in size up to no less than 20 in. in diameter, and a great deal depended on their good behavior in service. Fracture, if the broken end of the electrode fell into the steel bath, might be disastrous to a whole cast of steel, and, in any case, gave rise to delays which were objectionable both on the score of consumption of electric power and difficulty in controlling the changing composition of the steel.

These carbon electrodes, continued the author, are of two kinds, the amorphous and graphite. The former give most trouble, and, being also more heterogeneous in structure than graphite electrodes, are more suitable for radiographic examination. The data in this paper, therefore, refer more particularly to these amorphous electrodes, though specimens of graphite electrodes are also included. The method by which amorphous electrodes are produced is roughly as follows, though in detail it is naturally more complicated. A highly carbonaceous material, such as retort carbon, anthracite or petroleum coke, or mixture of these, is crushed and mixed with binders such as pitch and tar. The plastic mixture is then molded under pressure, either in cylindrical containers or by extrusion, and the molded electrodes baked into a solid mass in furnaces under conditions which prevent oxidation.

A number of electrodes obtained from different makers were therefore selected for examination. As an indication of the general purity of the specimens, the amount of ash residue after combustion was determined. Measurements were also made of the specific gravity, both apparent and real, the relative values of the two giving the porosity, and a record taken of the general character of the specimens. These data are given in the table. Transverse sections were cut from these elec-

trodes, the sections being 1 in. in thickness. These were sent to Messrs. H. W. Cox & Co., 159 Great Portland Street, London, W., who radiographed them and prepared stereoscopic negatives.

In the first set of radiographs the specimens were

Table of Results of Examination of Various Electrodes Analysis

Diameter, in.	Ash Per cent	Carbon (by diff.), Per cent	Specific gravity		Porosity, Per cent
			Actual	Apparent	
1st Set					
A 14	5.2	94.8	2.22	1.47	33.8
B 18	4.2	95.8	1.80	1.59	11.5
C 18	15.8	84.2	1.79	1.59	11.0
D 18	3.4	96.6	2.09	1.61	22.9
2nd Set					
E 14	3.2	96.8	2.07	1.59	23.1
F 16½	4.5	95.5	1.71	1.65	3.5
G 17	4.7	95.3	1.92	1.55	19.5
H 20	4.4	95.6	2.19	1.62	26.1

- A. Coked ground mass containing rather small lumps of anthracite.
 B. Coked ground mass containing dull rather coarse lumps like anthracite.
 C. Coked ground mass containing rather small lumps of anthracite.
 D. Like C, but larger lumps of anthracite.
 E. Like C.
 F. Mostly small shiny grains, not much ground mass visible.
 G. Coked ground mass, moderately coarse lumps of anthracite.
 H. Anthracite very small in size and amount.

exposed by themselves, but for the second set small boxes of some of the materials used in electrode manufacture, such as retort carbon, pitch and anthracite, were included with the object of identifying the character of the grains seen in the electrode sections. Positive plates were printed by contact from the negatives, and examined in an X-ray stereoscope made at the Hecla Works of Hadfields, Ltd. These showed in a very clear manner the structure of the various electrodes so far as it was rendered visible by the X-rays, and in a much clearer manner than was possible in photographic reproductions. It cannot be said, however, that much further light is thrown on the behavior of electrodes as the result of the radiographic examination of this miscellaneous selection.

Comparison of the structure with the behavior of these electrodes in service shows that coarse structure is apparently not detrimental to good behavior (that is, freedom from fracture in service), as the best electrode, C, in this respect, has certainly a very coarse structure, while at the same time the worst, H, also has a coarse structure. The specimen with the finest structure, F, is of only average quality.

Two specimens taken from graphite electrodes were included. These gave perfectly structureless radiographs, though a crack showed up very clearly.

Probably the best use of radiographic examination might be made in connection with systematic experiments on electrode manufacture, where variations of composition, baking temperature, etc., would be carried out step by step. It is possible that differences in structure might then be traced in the various radiographs obtained and connected with the variations in manufacture. The peculiar character of certain grains might, for example, be explained. From the appearance of these grains it would seem that they are in process of assimilation into the matrix of the electrode, and, if this is the case, such a systematic research would no doubt show this assimilation in progressive stages. It may be added that this radiographic examination of the carbon electrodes proved of considerable service to Messrs. Hadfields, Ltd., Sheffield.

Detection of Hair Cracks in Steel

In a note under this heading, Lieut.-Col. C. F. Jenkin said that considerable claims had recently been made for X-rays as detectors of hidden flaws in steel. The only flaws concerning which he was interested were the hair cracks which had given considerable trouble in aero engine crankshafts, and there seemed no likelihood that X-rays could reveal them, but he was persuaded to test the matter practically. Samples were examined by the X-ray apparatus by the experts who were pushing the process. They were pieces cut from

crankshafts with large and relatively obvious flaws, but no trace of defects was shown by the X-rays. One sample, about 2 cm. thick, was cracked right through the thickness for a length of about 6 cm., but there was no evidence of the crack in the radiograph. If such large flaws could not be detected, it was obvious that the method was useless for finding hair cracks.

Discussion

In the general discussion which followed Dr. C. A. Edwards, Manchester University, drew attention to the very great bearing which this work would have upon the future of all metallurgy.

Captain Jackson, admiralty inspector of steel in Sheffield, said the application of X-rays would enable them to check whether there were internal flaws in the material without it being necessary to keep any permanent record of the observations, except in cases of defect or suspicion of defect. He almost hoped that they would be able to determine whether there were flaws by merely passing the material before some form of screen, and, by the shadow on the other side, to reject or pass it straight away. One of the troubles with heavy gun forgings was the question of small defects in the steel, particularly nickel-chrome steel. With this steel there were typical flaws which did not always appear on the surface. Perhaps it was found that in turning a gun forging certain flaws appeared. With further turning they disappeared, but other flaws made their appearance. When they came to the finished gun forging, perhaps there were no visible flaws, and then the inspectors had to make up their minds whether there were any flaws in the forging or not. As they could not see any, they had to say there were none. In order, however, to accept forgings under these conditions, and so as not to run any risk in doing so, it was necessary to have a large margin of safety in the design, whereas, if they could be perfectly certain that there were no flaws, that margin could be reduced. Consequently, if X-ray examination could be developed so that it was possible to thoroughly examine thick steel forgings to ascertain whether there were any flaws in them or not, it would be of great practical advantage in the development of ordnance.

There was another direction in which such a method

would be valuable. During the times of pressure through which we had recently passed, the assembling and inspection of fuses had to be carried on with great rapidity, and there was always the possibility of important components being left out. In two particular instances which came under his notice it was desired to know whether components had been omitted from certain fuses, and X-ray examinations would have enabled him to have examined the fuses without the trouble of taking them apart to find out.

Application to Other Materials

S. A. Pollock, representing the postmaster-general, said that the post office 20 years ago appreciated the possibility of using X-rays for the examination of soft materials—for instance, gutta percha for submarine cables. X-ray examination had been used with great success. He was of course referring to the old-fashioned method of examining such materials by means of X-rays. The post office had not yet used the method for examining steels, which was a new development. It was sometimes found that after a lead-sheathed cable had been in the ground for two or three years—and such cables often involved a capital expenditure of £100,000—the lead was found to be defective, owing either to the effects of expansion or contraction. The sheath was found to have opened, and the cable had to be drawn out and replaced. Metallography had been found very useful in detecting such defects before the cable was laid. The temperature of the lead in the press was often responsible for failure.

The post office was also very much interested in ascertaining why stainless steel resisted oxidation, and whether it would resist nitric acid and hydrochloric acid. They would like to know whether X-ray examination would show the reasons for this non-corrodibility, because this matter was of very great importance in the manufacture of submarine cables. A submarine cable with ordinary material had been reckoned as having a life of 20 years, this being fixed by the corrosion of the sheath. He was also interested in the power required to examine thick castings of metal or metal made in large forms. It seemed a very remarkable thing that there should be penetration through such thicknesses, and showing relatively small defects.

REBUILDING FRANCE

Government Buying as Much as Possible at Home—Registration

WASHINGTON, June 17.—France is making advances at the rate of 6,000,000 francs a day for the rebuilding of industries in the devastated regions, according to a special report prepared by Acting Commercial Attaché C. D. Snow at Paris. The French Government, however, is buying everything possible in France.

The work is being done through the "Comptoir Central d'Achats Industriels pour les Regions Envahies" which is clothed with this power by a special law.

"The director of one of the bureaus of the comptoir assured me," writes Mr. Snow, "that he would be glad to deal with any American firms which have stock on hand in France. When it is absolutely necessary to get some kind of industrial equipment quickly for urgent reconstruction work the comptoir makes purchases outside of the country. Even this organization, under the control of the Ministry of Industrial Reconstitution, has to have the approval of the French Ministry of Finance before placing an order abroad.

"Whereas the comptoir makes only purchases of industrial equipment, the Ministry of the Liberated Regions (working closely with it and with the Ministry of Public Works, the Ministry of Agriculture, and the Food Administration) makes all the purchases incidental to the restoration and reorganization of local housing and social life, building materials, road repair, and transportation generally in the devastated regions, and agricultural reconstruction.

"The Ministry of Industrial Reconstitution and the Ministry of the Liberated Regions between them are

at present clothed with most of the functions of reconstruction, so far as the devastated regions are concerned. The comptoir, under the control of the Ministry of Industrial Reconstitution, is providing industrial equipment against individual indemnity claims, and the Ministry of the Liberated Regions is providing housing and household equipment and agricultural equipment against individual indemnity claims, in addition to taking charge of the general reconstruction work."

At the same time the American embassy has cabled to call the attention of American firms desiring to do business in France through branches or agencies, to the new law for commercial registration which has just been promulgated. This law provides for the registration of all "tradesmen," and appears to be aimed to secure particular details concerning the nationality and "previous nationality" of tradesmen, apparently for the purpose of keeping a record of those who were at one time of enemy nationality.

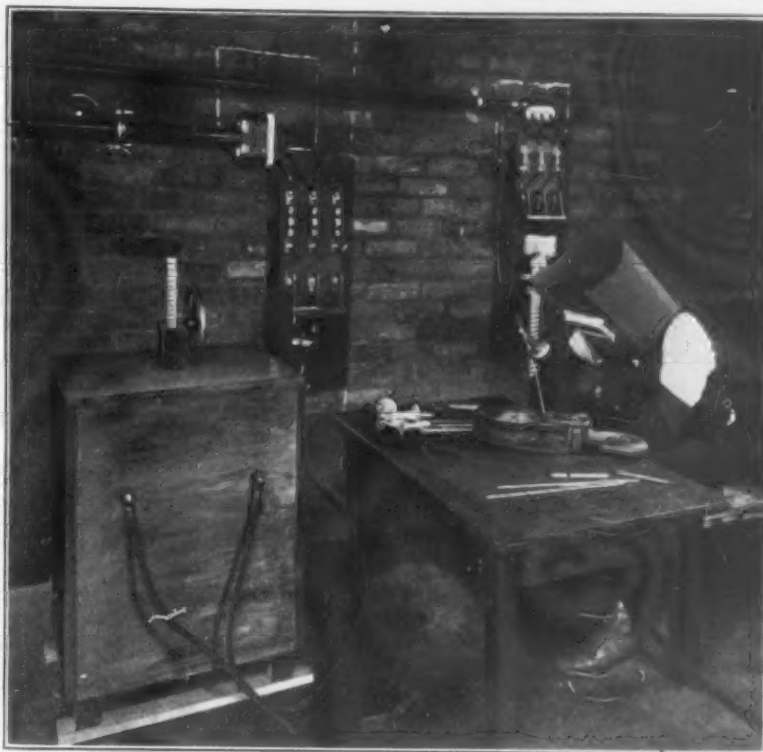
The ownership of Abendroth Brothers, Port Chester, N. Y., has been acquired by new interests. The following directorate has been elected: Philip R. Mallory, president; Clifford D. Mallory, vice-president; Frederick K. Leatherbee, treasurer; Richard C. Hunt, secretary; Frank E. Seeley, general manager, Harral S. Tenney, president Greenwich Trust Co. The firm was established in 1840 and has long occupied a prominent position in the manufacture of stoves, boilers and soil pipe.

The Morgan Construction Co., Worcester, Mass., has been awarded the contract for an 18-in. and a 21-in. finishing mill for the Weirton Steel Co., Weirton, W. Va., on which slabs, sheet bars and small billets will be rolled.

Transformer Arc Welder

An arc welder, which uses a transformer in place of direct current with a motor generator set, is announced by the Gibb Instrument Co., Detroit. Features emphasized are economy in current consumption and adaptability to overhead welding. The device is also said to be capable of welding cast iron.

The welder is comparatively small and is portable. It is built on a unit system whereby a concern may install a 150-ampere machine, and when the work becomes heavier a duplicate may be connected in parallel with the original machine. For regulation, a wheel connected with a secondary coil and extending through the top of the case, raises and lowers the coil and provides for the regulation of the current necessary for different sizes of electrodes. It is stated that the inherent reactance automatically stabilizes the arc for different arc lengths.



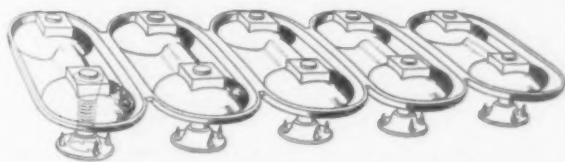
Transformer Arc Welder for Which Economy of Current and Adaptability to Over-Head Welding Are Claimed. The work is resting on a metal sheet which is connected to one terminal of the transformer

provided in the laws of the different jurisdictions is altogether too small in amount and the waiting period before compensation is allowed is much too long.

Don D. Lescohier, professor of Americanization, University of Wisconsin, read a paper on "The Supply of Labor after the War." Among his striking statements were the following: "It is idle for us to waste time denouncing Trotsky, Lenine, or any of those leaders. Those leaders have simply focused heartaches. The thought of capitalists has conceived the workman as a laborer rather than a father, husband and citizen. Investigation after investigation of employment conditions has demonstrated a continuing supply of idle men in America. Men have lacked work at the same time that employers have lacked men. There have never been less than 1,000,000 idle men and often five or six million at a time during the last 20 years. Our unorganized labor market has made it impossible for employers to get labor from any central agency as they get capital from the banking system. The war decreased immigration's contribution to our labor supply about 85 per cent. It is our belief that immigration from Europe will decrease after the war, but that decrease will not be a menace to our industrial and commercial advancement. It will, instead, be a benefit." In speaking of the possible effort of employers to reopen our gates to Oriental immigration, he concludes, "if it should be done, it would bring the whirlwinds of the workers' wrath about our heads, and develop a hatred of our economic system among millions."

Plate Fastener for Heavy Belts

The plate for joining heavy belts illustrated is manufactured by the Sawyer Belt Hook Co., Paw-



One Piece Plate for Joining Heavy Belts

tucket, R. I. The plate is a one piece malleable casting and is made for 10, 12 and 14-in. joints. The device is intended for use with leather, rubber or canvas belts.

American Association for Labor Legislation

The proceedings at the twelfth annual meeting of the American Association for Labor Legislation at Richmond, Va., Dec. 27, and 28, 1918, are contained in the March issue of The American Labor Legislation Review, issued quarterly. The general topic at the meeting was "Labor and Reconstruction." Papers were presented by 19 men and women.

Major Thomas I. Parkinson, director legislative drafting department, Columbia University, treated the "Constitutionality of Treaty Provisions Affecting Labor," and concluded that an international labor agreement may be carried out by the United States through an act of Congress based either upon inherent power to carry out the treaty obligation or upon the power to tax out of existence conditions contrary to the obligation thus assumed.

Royal Meeker, United States commissioner of labor statistics, took up the subject, "Lacks in Workmen's Compensation." He said the money compensation

June Meeting of New York Steel Treaters

The second meeting of the New York Chapter, American Steel Treaters' Society, will be held in Assembly Room No. 2, Engineering Societies Building, New York, on Friday, June 20, at 8 p. m. The program will include papers on "High Speed Steel—Its Metallography and Heat Treatment" (Illustrated), by G. J. Horvitz, New York Testing Laboratories; "The Effect of Certain Elements on the Properties of Steels," by N. J. Gebert, metallurgical engineer, and "Heat Treatment as Applied to Railroad Materials," by C. B. Bronson, consulting engineer's office, New York Central Railroad Co. All members are urged to bring as many guests as possible.

William M. McFate, vice-president Trumbull Steel Co., Warren, Ohio, announces that the recent offering of \$2,700,000 preferred stock was oversubscribed about \$600,000. The issue was part of a recent authorization of \$4,000,000, the rest being used to pay for the Liberty Steel Co., acquired by Trumbull.

Samuel I. Perlman, Philadelphia, has engaged in the export and import of steel products.

GERMAN STEEL EXPORTS

Prospects Regarded as Poor—Neutral Orders Difficult—Belgian Fear of German Competition

Prospects for Germany's resumption of exports of iron and steel are being canvassed and opinions seem to differ widely. The *Deutsche Bergwerks Zeitung* has the following:

The apprehension exists that even after the return of normal times, particularly after the raising of the blockade, Germany will only have a moderate percentage of the world's export trade in iron and steel, an opinion which is based upon various reasons. In the first place there is the inadequate means of producing. The absence of any disposition to work has caused a scarcity of material. The reduction in the length of the working shift, high wages and other concessions are no longer of avail in awakening reason in the workmen.

American and French Competition

It is stated generally in Germany that for England the result of the war is far behind calculation from an economic point of view, and that after having given the German iron industry a heavy blow in the world's markets, England will now have a great competitor in the American iron and steel industry, which seeks to enter the European trade, as well as in the combined Franco-Belgian-Luxemburg industry, if this group secures restoration of the devastated regions.

Competition in international iron export markets is already in full swing where the circumstances permit. France finds it easy with the production of the Lorraine works to operate in Switzerland and Italy, with the result that Germans have been compelled to lower their export prices on two recent occasions. The conditions in the Scandinavian countries are similar. Unfortunately, the production in Germany is so small that many orders which reach the German market from neutral countries at comparatively favorable prices have to be refused owing to the impossibility of effecting delivery through the unreasonableness of the German workmen. It is calculated that Holland will soon again require German manufactures and the same remark applies also to Scandinavia, with the exception of Norway, where the feeling continues to be very anti-German. An active business is reckoned on with Mexico, Argentina and certain other South American countries which broke off their relations with Germany during the war, but which will probably soon again pave the way toward an economic arrangement. It is also assumed that a more active exchange of goods will develop with Japan. Everything depends upon the question of the availability of material for exportation.

Krupps and Neutral Orders

Seeing that since the armistice it has been impossible to secure enough domestic orders to provide employment for their workmen, the managers of the Krupp company say that they have been compelled to devote special attention to procuring orders from neutral countries and succeeded in obtaining a number of orders up to a little time ago. Recently, however, neutral countries have become very reserved in giving orders to Germany, buyers saying they no longer have any assurance of getting deliveries at the right time. In consequence of the continued strikes at the collieries, as well as at the iron and steel works, the neutrals prefer to place their orders in England and America. Owing to these circumstances Krupps say they have recently lost a number of orders which would have been of much help to German exchange.

Belgium and German Competition

The apprehension in Belgium as to German competition and as a result of recent labor disputes has been voiced by the *Independence Belge*. It says that Belgian manufacturers who have returned from the occupied districts of Germany consider all statements respecting German poverty and economic ruin a pure invention. The majority of the works on the left bank

of the Rhine are in full operation. All have plentiful supplies of raw materials of which a portion was derived from requisitions and plundering to which Belgian industry had to submit. Through the low rate of exchange and bank credit which is available to them at any time, the German manufacturers are able to supply many goods at remunerative prices. There is no question of a reduction in the working shift on the left bank of the Rhine. Both workmen and employers are striving to reach the maximum production, because they know that only by an increased output can the victorious and beaten nations be saved from collapse. As soon as economic relations with Germany are resumed, German manufacturers will be able to flood the Belgian market with cheap goods. The Belgian newspaper consequently calls upon native employers and workmen to settle their differences, and on the government to regulate the import trade, so as to ward off the danger which threatens the country.

German Steel Output for March

The German steel output for March, according to the Association of German Iron and Steel Manufacturers, was 654,893 metric tons. This compares with 529,913 tons in February this year and with 1,339,320 tons in March, 1918. The basic open-hearth steel output was 345,209 tons in March and electric steel 6996 tons. The greater part of the remainder was 266,472 tons of basic Bessemer steel.

The production of the German rolling mills in March averaged about half that of a year ago and was a slight improvement over February. The total, including semi-finished steel, was 566,021 tons, as compared with 459,145 tons in February of this year and with 919,548 tons in March, 1918.

Blowing in Blast Furnaces

YOUNGSTOWN, OHIO, June 17.—Reports from blast furnace operators indicate that 20 of 25 stacks in the Mahoning valley will be in operation by Aug. 1. There are now 17 furnaces producing metal. New stacks expected to be blown in during July are the Byers stack at Girard, operated by the A. M. Byers Co., Pittsburgh; one of the battery of the Republic Iron & Steel Co. at Haselton and No. 2 of the Youngstown Sheet & Tube Co. at Hubbard. With 20 furnaces pouring, the daily pig-iron output in the Mahoning valley will be close to 10,000 tons, fully 10 per cent of the total production in the country.

Schedules in finishing departments were substantially accelerated this week, the Sharon Steel Hoop Co. operating all its mills at the Mahoning valley plant. The Republic Iron & Steel Co. is operating six units of the Brown-Bonnell works, with three mills down. The rest of the plant is on a 65 per cent basis.

The Youngstown Sheet & Tube Co. is operating this week nine tube and four skelp mills, 12 sheet mills, five open hearth furnaces and a blooming mill. Both Trumbull Steel Co. at Warren, Ohio, and Carnegie Steel Co. plants are running close to normal.

The Westinghouse Agent Jobbers' Association held its seventh annual meeting at Hotel Del Monte, Del Monte, Cal., recently. The following officers were elected for the ensuing year: F. E. Stowe, who is secretary-treasurer of the H. C. Roberts Electrical Supply Co., Philadelphia, president; S. L. Nicholson, assistant to vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, vice-president; C. C. Blackwell, manager of electrical department of the Moore-Handley Hardware Co., Birmingham, Ala., secretary; H. T. Pritchard, Westinghouse Electric & Mfg. Co., assistant secretary; J. E. McClernon, president Northwestern Electric Equipment Co., New York, treasurer. The newly elected executive committee includes J. C. Schmidtbauer, vice-president of the Julius Andrae & Sons Co., Milwaukee, Wis.; Samuel Adams Chase, special representative Westinghouse Electric & Mfg. Co., East Pittsburgh; John J. Gibson, manager supply department Westinghouse Electric & Mfg. Co., East Pittsburgh.

PROPOSED DUTY ON MAGNESITE

American Refractories Co. and Northwest Magnesite Co. Interests Clash

WASHINGTON, June 17.—The steel industry has an interest in the controversy which has arisen in the Ways and Means Committee of the House of Representatives over the proposal to put a high tariff on magnesite. Representative Hadley of Washington introduced a bill providing for a duty of $\frac{3}{4}$ c. per pound on crude magnesite, $1\frac{1}{4}$ c. on calcined magnesite, and 25 per cent on magnesite bricks.

The bill was favored by Representative Hadley and Representative Kahn of California, as well as by representatives of the Northwest Magnesite Co. of Washington, and other magnesite producers. The opposition came from representatives of the American Refractories Co. of Pittsburgh, owner of magnesite mines in Austria. E. M. Allen, vice-president of the latter company, charged that the Northwest Magnesite Co. had attempted to monopolize American production of magnesite, and declared that it was owned by the Crocker National Bank interests in San Francisco. He told the committee that one of the former employees of the American Refractories Co., now in the plants of the Northwest company, declared their production cost to be \$11.50 to \$12 per ton. He said their prices were \$26.50 to \$33. He also created a sensation by reading to the committee a letter written by Roy N. Bishop, manager of the Northwest Magnesite Co., addressed to P. D. Mossman of the Pittsburgh company, in which Mr. Bishop said that some of their product had been sold at \$90 a ton through another company to the Bremerton Navy Yard, whereas the Pittsburgh company was charging but \$35 a ton. "I thought if you knew what we had been obtaining for this material," Mr. Bishop wrote, "you might want to raise your prices."

Mr. Allen declared that his company had invested \$2,000,000 in the Austrian mines to protect the American steel and copper industries against the monopoly of the German-Austrian magnesite syndicate at a time when there was no American production.

The officials of the Northwest company vigorously denied the charges of a monopoly, and presented statistics to show that their costs totaled more than \$23 per ton.

Representatives of the tungsten industry ask the Ways and Means Committee for a duty of \$10 per unit on tungsten. Representative Timberlake of Colorado, who introduced the bill, said there were 21 producers of tungsten ore in Colorado, all of whom would be compelled to close down unless they had protection against foreign competition.

Power Situation in New England

The manufacturers of power plant equipment in New England report a large inquiry from a limited class of customers, chiefly the companies operating electric lighting and power plants which have a well-established plan to make their units as large as possible to secure lower costs. It is expected they will be large buyers.

The electric railroads, formerly large and frequent buyers, have been hard hit of recent years by the rapidly increasing cost of labor, fuel, equipment and supplies and from the advent of automobiles, and a great many of them are not earning dividends; in fact, receiverships have resulted in not a few cases. Experience in New England is that increased fares do not bring proportionate returns, because of the resultant falling off of traffic. What is believed to be the limit of fares has been reached, beyond which receipts would be even less than at the original lower rates. Assistance from tax levies has relieved the situation in the metropolitan district of Boston, where the Elevated is operating under a plan established by the State Legislature, which guarantees dividends to stockholders and apportioned deficit in operating among the cities and towns served by the company. But this is the excep-

tional case, and practically every other street railway is either actually running behind or barely making ends meet. Therefore, little buying of anything is being done, excepting where actual necessity arises, and there is little chance of power plants being improved in any way. What is true of New England is equally true throughout the country, the power equipment people state.

As for the industrial works of New England practically all of them are well supplied with power. Power plants were increased during the war, notably in works engaged on war materials, and there is a rapidly increasing tendency to purchase power of the big company which has developed enormous hydraulic power in Western New England and is distributing it through practically all of the manufacturing territory of these states.

The unfortunate condition of the street railroad companies affects manufacturers of all sorts of products bought by these companies, and some of the large concerns dependent on this trade are turning their attention to other lines.

Newton Steel Co. Incorporated

YOUNGSTOWN, OHIO, June 17.—The Newton Steel Co., promoted by Edward F. Clarke, president of the Liberty Steel Co. and associates, has been incorporated under the laws of Ohio for \$3,000,000, divided \$2,000,000 common and \$1,000,000 preferred. The company will erect a sheet mill plant at Newton Falls, Trumbull county. One-half of each class of stock will be marketed at once. It is declared all the stock necessary to finance the initial building operations has been subscribed. A provision in the articles of incorporation requires that before a bonded debt can be created the assent of not only three-fourths of the stock in amount but three-fourths of the stockholders numerically must be secured.

The contract for 1100 tons of structural steel to be used in the first building to be erected has been awarded to the McClintic-Marshall Co., Pittsburgh.

Fasteners for Conveyor and Elevator Belting

A belt fastener designed to provide a joint of high tensile strength as is required by conveyor and elevator belting has been placed on the market by the Flexible Steel Lacing Co., 522 South Clinton Street, Chicago.



Belt Fastener for Heavy Duty

The fastener is of steel, made smooth on both sides and with an even balance, thus to provide a durable joint.

The fasteners are made in various sizes for belts $\frac{3}{8}$ -in. and over in thickness.

History of Prices

The Price Section of the War Industries Board, Washington, is planning to publish a history of prices during the war, covering the field of prices from the beginning of 1913 to the end of 1918. The bulletins have been designed to meet the needs of business men by their division into 50 important industrial classes. The first bulletin, No. 2, will be on "International Price Comparisons" and will be published in a few days, to be followed by more than 50 other bulletins including No. 3, "Government Control Over Prices"; No. 6, "The Prices of Building Materials"; No. 33, "Iron, Steel and Their Products"; No. 34, "Ferrous Alloys, Non-Ferrous and Rare Metals"; and No. 35, "Coal and Coke."

Chairman Manly Arouses Indignation

Radical Speech at Atlantic City by Official of National War Labor Board, Who Criticizes Congress
—Return of President Wilson Awaited with Interest

WASHINGTON, June 17.—Labor troubles show no signs of clearing as far as the National Government is concerned. Whatever the outcome of the telegraph strike, there are increasing signs of cleavage between the men in Washington who are trying to find a peaceful settlement of the difference between capital and labor and those who are attempting to use the powers of the Government to force their own views to success.

Because of this, much interest attaches to the return of President Wilson. His name has been used by both sides, but except for his message to Congress favoring on broad lines the labor clauses of the proposed peace treaty, there has been no expression from him. There seems reason to fear, however, that he is more faithfully represented by the views of Basil M. Manly, joint chairman of the National War Labor board, Secretary Wilson of the Department of Labor and Samuel Gompers, president of the American Federation of Labor, than by Postmaster General Burleson, Secretary Redfield of the Department of Commerce, or by the more conciliatory leaders in Washington. Not that Messrs. Redfield and Burleson hold identical views, but neither of them seems to agree with the attitude of Messrs. Manly, Gompers, and Wilson.

Attitude of Leaders

Even more interesting is the attitude of the leaders in Congress. The fight over the National Employment service, led by Messrs. Wilson and Gompers, is denounced as a "pro-union" agitation, and the result will be far from unanimous. A joint hearing before the House and Senate committees on labor will be held Thursday, when it is expected that there will be a liberal airing of divergent and heated views. The National Association of Manufacturers is leading the battle against the service, and there is every indication of fireworks.

The two men whose views on the labor question are most important to Congress are Senator Kenyon of Iowa and Representative J. M. C. Smith of Michigan, chairmen respectively of the labor committees of the Senate and House. Neither of these men has given any indication of incendiary views. Senator Kenyon is of progressive extraction and has trained with the progressive wing of the Republican party. But he declares he is in favor of conciliatory legislation, and is seeking to bring labor and capital together to a friendly airing of views. He says he believes more can be accomplished in this way than by precipitating a fight. Mr. Smith takes practically the same attitude.

On the other hand, Chairman Manly of the War Labor Board is less moderate about his views. He delivered a speech at Atlantic City which has aroused much protest because of its talk about Bolshevism and its incautious reference to dynamite.

"We are about to enter a period of the most acute industrial unrest," said Mr. Manly in his Atlantic City speech, "and the most bitter industrial controversy that the American nation has ever known. Unless effective and radical steps are taken to bring about a better understanding between labor and capital and to establish an equitable basis for orderly industrial progress, we are certain to see within the next year, strikes and mass movements of labor besides which all previous American strikes will pale into insignificance.

"I am making no threat that Bolshevism or Spartanism is about to sweep the United States. The American Labor movement will not go Bolshevik unless it is driven to that course by the goadings of selfish and unenlightened and capitalistic agents.

"With the people and particularly the workers in a state of exasperation as a result of their daily struggle with an unjustly inflated cost of living, attempts are already being made by selfish and foolish employers

to reduce wages. Sometimes these attempts are made directly, but far more often by the device of shutting down the plants for a short period to repair the ravages of highspeed war production and then employing new men at reduced rates, and the burning shame of it is that in many instances these new men who are being hired at reduced wages are our soldiers, the goldstriped veterans of the great war, who return to America ignorant of the new wage levels and are easily made the dupes of unscrupulous and unpatriotic employers.

"There were indications at the recent convention of the National Association of Manufacturers that a concerted movement to reduce wages would be made by a large group of American manufacturers. Those people who banqueted so sumptuously at the Waldorf-Astoria while they concocted their plans for widespread reductions in wage were playing with dynamite and dynamite infinitely more dangerous, both to the capitalists and the public, than all the Mayday bombs of the anarchists."

Congress Is Denounced

The following reference to the conservatism of the present Congressional leaders sounds as though it might have been inspired by the attitude of Senator Kenyon:

"There is no hope for orderly industrial and social progress through the present Congress. The Sixty-sixth Congress of the United States is the least enlightened, the most reactionary Congress, that this generation has known. I do not except even the dark days of Cannonism and the Payne-Aldrich tariff. The present Congress contains as many hardshelled fossils as Cannon and Aldrich numbered among their supporters. But this Congress has no group of young, hardhitting progressives, such as threatened to depose Cannon from the speaker's chair and all but defeated Aldrich in the Senate. The progressives now in Congress are relatively old men, tired with 20 years of hard fighting. They have not quit fighting and they have not lost their ideals but they have lost their old punch and aggressiveness."

Secretary Wilson's speech at the American Federation of Labor convention at Atlantic City was somewhat more conciliatory, and he declared that organized labor would have nothing to do with Bolshevism and the I. W. W. But he referred to the employers "who wield the iron hand of oppression upon the workers," and was enthusiastically applauded for it.

There is still the suggestion that President Wilson will seek to bring capital and labor together at an industrial conference to be held after his return to the United States. If he does so, he probably will ask them to use the Paris labor planks as the beginning of their platform.

The situation is also being complicated by the continuance of the "No Beer, No Work" campaign, and the open fight which the American Federation of Labor is making on Prohibition. Chairman Smith of the House Labor committee has come out in vigorous opposition to this fight, and it is likely that his views will have some effect on the fate of other labor legislation sought by the union leaders. O. F. S.

Molders Strike at Worcester

The molders' strike at Worcester, Mass., is progressing well from the standpoint of the foundry owners. The workmen went out in all union foundries more than five weeks ago, compelling a practical shutdown. Today the Reed-Prentice Co.'s foundry is running with normal working force, and those of the Whitcomb-Blaisdell Machine Tool Co., Rice, Barton & Fales Machine & Iron Co., Holyoke Machine Works and the

Coppus Engineering & Equipment Co. are all in operation, each with a force which is nearly, if not quite, adequate to the needs. The Colvin foundry, which is open shop, but which the union has been interfering with, is running with a greater number of men than ever in its history. The Star foundry and that of the L. W. Pond Machine & Iron Co. are still shut down. The two piece work foundries, those of the Crompton & Knowles Loom Works and the Arcade Malleable Iron Co., have not been disturbed. The foundry owners believe they have established the open shop permanently, after a long period of union control. The strikers have become discouraged, it is understood. The injunction cases brought by the Reed-Prentice Co. and the Holyoke Machine Works have not yet come up for hearing in the superior court.

Labor Conditions in Europe

Labor conditions in Great Britain, France and Italy were outlined by the European Commission of the National Industrial Conference Board which recently met at the Hotel Astor, New York, to prepare its report. Charles W. Asbury, commission chairman, has given in advance some of his views. He said that in England the demands by labor organizations had been the most extreme and the effort to enforce them the most determined. The active labor parliamentary group had prepared a definite political program, entitled, "Labor and the New Social Order." The radical elements have seized the machinery of the labor organizations in the effort to enforce their views and methods at any cost. The more conservative among the union leaders are opposing the radicals vigorously.

In France the 8-hr. day law was put through, not so much because of an insistent demand on the part of workmen, but more because it was considered a matter of political expediency. French employers issued a printed protest against the law, claiming that the more attractive hours for city work would attract the farm labor to the detriment of the rural industries. Energetic radicals were elected to the Chamber of Deputies because of the indifference of the voters in opposing them.

The surplus of labor is the outstanding feature of the Italian situation. The Government unemployment donations have the effect of hiring men to remain idle. The outstanding lack is for coal, raw materials and the means of payment for these. The interference of politics has been working against the return of industry to normal conditions by which foreign exchange would rectify itself.

The other members of the commission are S. Pemberton Hutchinson, president Westmoreland Coal Co.; J. Lawrence Laughlin, economic adviser to the National Industrial Conference Board; Oliver S. Lyford, vice-president Santa Clara Lumber Co.; Loyall A. Osborne, vice-president Westinghouse Electric & Mfg Co.; William H. Van Dervoort, president Root & Van Dervoort Engineering Co.

Brass Workers Idle at Ansonia

At the close of a conference June 9, at which its employees presented demands, the American Brass Co. closed all its local mills in Ansonia, because the employees walked out. About 4000 were affected. The Ansonia Co. closed its plant, affecting about 700 more.

An American Brass Co. official stated that a committee of nineteen presented demands at 8:45 in the morning and insisted on an answer by 10 o'clock. The company tried to get the committee to keep the men at work for the rest of the day until an answer could be decided on, but the men began to straggle out at 10 o'clock and the mills closed.

The committee presented sixteen points in their demands, the most important being an increase of 25 cents an hour and double time for all over 8 hr. No demands had been made by the Ansonia Co. employees. The company stated that it would resume when everything had been settled.

The minimum wage at present in the Ansonia Brass Co.'s mills is 35 cents an hour. The company has been working in many departments on an 8-hr. schedule.

The 8-hr. day went into effect during the war, and has been continued since. Notices were posted in some of the company's mills last week that 10 hr. work would be given, but the company officials announced that there was no intention to do away with the 8-hr. day and the extra 2 hr. would be paid for at the time and a half rate. It was believed that many of the employees misunderstood the notice and took it to mean that the company wanted to restore the 10-hr. day.

Good Management Necessary

In his address at the convention of the National Association of Employment Managers at Cleveland recently, Dr. W. E. Leiserson of the Working Conditions Service, United States Department of Labor, called attention to the danger of misunderstanding as to whether the principle of collective bargaining is recognized in representative plans which are being adopted by various companies. He then said:

In spite of the danger in misunderstandings of this kind, a deluge of shop committees and employee representation plans is flooding the country. Employers, feeling unrest and distrust among their employees are seizing on these plans as a sort of panacea for all their labor troubles without clearly analyzing their troubles and the nature of the remedies. Employment managers, and labor experts also, I am sorry to say, are zealously advocating representative committees as if the mere organization of these would of itself solve any labor problem. A great many of our labor difficulties are caused by poor labor management. Democratic organizations of employees will not remove these. Only good management will help in such cases. Employees' organizations are needed to deal with labor troubles that arise under the best management, that grow out of the democratic movement in industry.

In the World of Labor

The plant of the Willys-Overland Co., Toledo, Ohio, which was shut down recently, following the labor disturbances in connection with its strike, resumed operations last week under protection of the Federal Court, which issued orders restraining interference with the operation of the plant, limiting the number of pickets and forbidding picketing by any men but American citizens.

Molders in Toledo, Ohio, have demanded a new scale of \$6.40 for an 8-hr. day. It is reported that several of the foundries have agreed to the advance.

After a shutdown for about two weeks, the plant of S. F. Bowser & Co., Fort Wayne, Ind., manufacturers of oil pumps, tanks, etc., was reopened June 10. The company anticipated a strike and suspended operations, affecting about 1000 employees; of this number, 350 returned to the works on the opening date; these employees will be paid for the closed period. The matter of controversy covers the operation of an open shop, which the company intends to maintain, at the same time expressing no objection to any employee belonging to a union.

About 2200 employees at the shipyards of Pusey & Jones, Gloucester City, N. J., returned to work on June 11, after a five-day strike, pending a settlement of their grievances, covering increased wage schedule, by arbitration. The strike was inaugurated by the rivet counters and later included riveters, reamers, drillers, shipfitters and others.

A number of molders at Minneapolis, Minn., foundries are out on strike with demand for 8-hr. day and increase in wages from 63 and 65c. per hour to 80c.

About 90 foundry and furnace helpers at the plant of the Farrel Foundry & Machine Co., Ansonia, Conn., walked out on strike June 10.

An organization of industrial employees has been perfected at Jersey City, N. J., in an effort to guard against Bolshevism and labor difficulties, taking in plants in the Lafayette section, including the Sneed Iron Works, Keystone Watch Case Co., American Can Co., A. B. See Elevator Co., and others. Edward L. Dillon of the Sneed Iron Works heads the association.

Total wage distribution for May at Youngstown, Ohio, dropped nearly half a million dollars behind April. Disbursements in May were \$6,269,247, compared with \$6,755,859 in April. The total payroll for the first five months of the year is \$35,910,875.

PERSONAL

A bronze bust of Judge E. H. Gary, chairman of the United States Steel Corporation and president of the American Iron and Steel Institute, shown in the accompanying half-tone engraving, was recently placed in the McKinley Memorial Building at Niles, Ohio, which city is located near the birthplace of the martyr president. The bust is the work of J. Massey Rhind, New York sculptor. Busts of Roosevelt, Taft, H. C. Frick and other statesmen and industrial leaders are also in the building, the erection of which was due very largely to the efforts of J. G. Butler, Jr., Youngstown, Ohio.



Worcester R. Warner, president the Warner & Swasey Co., Cleveland, and Charles F. Brush, electrical engineer, Cleveland, were made honorary members of the Cleveland Engineering Society at the company's annual meeting and banquet June 10. The honors were conferred upon the two men by Dr. C. S. Howe, president of Case School of Applied Science. E. S. Carmen, chief engineer Cleveland Osborn Mfg. Co., and president-elect of the

society, was a speaker at the banquet, describing industrial conditions in Europe. He returned the preceding day from a several months' trip abroad.

Christian Girl, president Standard Parts Co., Cleveland, has been awarded the Distinguished Service Cross by the War Department in appreciation of the aid he rendered in developing the Standard Government motor truck.

L. J. Voyer has been elected secretary of the Ohio Corrugating Co., Warren, Ohio, and appointed general sales manager. He succeeds W. P. Reed, resigned. Mr. Voyer was formerly manager of sales of the Liberty Steel Co.

L. M. Moser, formerly foundry superintendent of the Hamilton Machine Tool Co., Hamilton, Ohio, has accepted a position as general superintendent of the Advance Foundry Co., Dayton, Ohio. A. H. Kramer is president of the Advance company.

K. F. Van den Berg, managing director Bank of Java and Netherlands Indian Government commissioner, who has been in this country for several weeks promoting trade relations between the United States and the Dutch East Indies, will sail about the first of July for Java via Holland. He will leave J. C. Ankersmit, Room 2033, 17 Battery Place, New York, in charge of the purchasing of American materials, principally iron and steel products, for the Dutch East Indies. Mr. Van der Berg estimates that for the next

five or six years Java and Southern Sumatra will need 50,000 tons of rails a year for maintenance and possibly additional tonnage in case of new construction.

James A. Kelly, formerly engaged in consulting work in New York, has become chief draftsman for the Morse Dry Dock & Repair Co. yard, Brooklyn, N. Y. During the war he was naval architect of the concrete division, Emergency Fleet Corporation, and later was with the La Salle Engineering Co., Chicago.

H. Sanborn Smith, vice-president Gulf States Steel Co., has returned from a business trip of several months to Great Britain and continental Europe.

Merrill G. Baker, who was appointed president of the American International Steel Corporation, 120 Broadway, New York, on April 1, has tendered his resignation, which takes immediate effect. No successor has been appointed, Morris Metcalf, vice-president, being the executive now in charge. Mr. Baker's plans for the future have not been announced.

James E. Mathews has resigned as manager of ordnance, Bethlehem Steel Co., after nearly 20 years in that capacity. The decision was made because of ill health. He will be succeeded by G. W. Struble, a graduate of Annapolis Naval Academy, who has been in the ordnance department of the Bethlehem company since 1914.

Lieut. William H. Beckwith has been made foreman of the iron valve department at the Kewanee, Ill., works of the Walworth Mfg. Co., Boston. Harold D. Richards has been placed in the same works as superintendent of materials. Both were formerly with the Gilbert & Barker Mfg. Co., West Springfield, Mass.

V. V. Lebedjeff, president V. V. Lebedjeff Engineering & Supply Corporation, New York, who intended to go to Europe on a business trip, as announced in the June 5 issue of THE IRON AGE, has decided to let European conditions become more settled and will therefore leave the latter part of the month for China and Japan, proceeding to Europe from these countries if conditions are then favorable.

E. A. Hitchcock has recently become connected with the Bailey Meter Co., Cleveland, as vice-president. He will supervise the training of technical graduates for the company's service and sales departments. During the past six years he has been with the E. W. Clark & Co. Management Corporation as advisory, consulting and power sales engineer. Previous to that time he was professor of experimental engineering at Ohio State University.

Henri Nourry of the firm of J. Horstmann, 83 Rue St. Maur, Paris, dealer in machine tools, small tools and steel, returns to France on June 21 on the L'Espagne after a few months in this country.

The Sullivan Machinery Co., Chicago, has appointed George H. Richey as New England sales manager to succeed George Elmer Wolcott, who died on May 10. Mr. Richey has been associated with Mr. Wolcott as sales engineer in New England and eastern Canada for several years. The Boston offices remain at 201 Devonshire Street.

The Erie Crucible Steel Co., Erie, Pa., has appointed D. A. Bonitz, a manufacturer's agent for the past eight years, as its Chicago representative with offices at 1816 Fisher Building; also the Tidewater Steel Products Corporation, 149 Broadway, New York, as representative in New York and Philadelphia districts.

John H. Connor, vice-president United Shoe Machinery Corporation, Boston, has just returned from Paris after a several months' survey of the industrial conditions in the belligerent countries.

J. H. Wilson has been appointed works manager for the Berger Mfg. Co., Canton, Ohio, sheet metal products. Formerly he was associated with the La Belle Iron Works, the Gary plant of the United States Steel Corporation, and the American Rolling Mill Co.

W. H. Woody has been appointed manager of the new Washington office of the Keller Pneumatic Tool Co., Grand Haven, Mich., located in Room 509, Munsey

Building. For six years Mr. Woody supervised the shipfitters and allied trades at the Government yard at Portsmouth, Va. Prior to this he was special representative of the Chicago Pneumatic Tool Co.

J. G. Carruthers, manager of sales Carnegie Steel Co., at Cincinnati, recently appointed manager of sales for the Chicago district of the Illinois Steel Co., having offices at 208 South La Salle Street, assumed his new duties June 16. Mr. Carruthers has been with the Carnegie Steel Co. at Cincinnati over nine years. Previous to that time he was with the Cambria Steel Co. a number of years. All of his business life has been spent in the iron and steel business. He will be succeeded at Cincinnati by George H. Vant, who will be transferred from the Pittsburgh office of the Carnegie Steel Co.



J. G. CARRUTHERS

T. J. L. Crane of the Wales Advertising Co., 110 West Fortieth Street, New York, will sail for England on July 1 in the interest of clients. Mr. Crane is an Englishman who has spent many years in the United States, and is in charge of a number of national campaigns handled by the Wales Advertising Co. During the war he served in the Royal Flying Corps of Canada.

George W. Jones, recently appointed manager of the Chicago office in the McCormick Building, of the Pittsburgh Steel Co., Pittsburgh, has been with the company since 1908, first selling wire fencing and barbed wire in the farming communities of New York State. Later he went to the general office in Pittsburgh, where he assisted in the management of the fence sales department. Mr. Jones is well known in the jobbing and retail hardware trades, is a member of the Whitehall Club, New York, and a past president of the Columbian Club, East Orange, N. J.



GEORGE W. JONES

Dan C. Swander, vice-president and supervisor of sales the Standard Parts Co., Cleveland, has sailed from New York on the Carmania, planning to visit manufacturers in England, France and other European countries with a view to increasing the foreign trade of the company. The Standard Parts Co. had some desirable foreign connections before getting into war work and has recently received inquiries which indicate a likelihood that its export work may be increased to a substantial volume. Mr. Swander will investigate the possibilities of the market and make some study of conditions as to present and probable requirements, particularly in the motor car, truck, trailer and tractor fields. He expects to be absent until August.

H. A. Robinson of the raw material department Midvale Steel & Ordnance Co., Philadelphia, has joined the sales staff of Park & Williams, Inc., Real Estate Trust Building, Philadelphia, dealer in pig iron, coke, ferroalloys, etc.

Edward F. Davis, who has had wide experience in gas engineering, has joined the staff of the Celite Products Co., New York, and will specialize in the application of the company's insulating products to gas manufacturing and industrial gas equipment.

Howard Taggart, connected with Lukens Steel Co.,

Coatesville, Pa., for over 30 years, has retired from active service. He was engineer of tests and director of the company. Mr. Taggart will be succeeded by William G. Humpton, formerly his assistant.

Asher Golden, 311 West Thirty-ninth Street, New York, has been appointed by Compagnie d'Applications Mécaniques, Paris, its exclusive agent in the United States for the sale of RBF thrust, demountable (magneto type) and plain roller (maximum heavy duty) bearings and thrust bearing retainers, complete with balls.

J. W. McCabe, who until recently has been district manager of sales for the Chicago Pneumatic Tool Co. at Buffalo, has been appointed special representative for the company's foreign trade department and will depart shortly for an extended trip throughout the Orient, Philippine Islands, and Australia. W. H. White has been appointed acting district manager of sales at Buffalo to take charge of that territory during Mr. McCabe's absence.

Edwin T. Jackman, formerly of E. S. Jackman & Co., Chicago, has returned from Sheffield, England, where he has been investigating methods in connection with tool and alloy steels. On July 1 he will become manager of the Boston office of the Firth-Sterling Steel Co.

Major George W. Semmes, vice-president and chief engineer Akerlund & Semmes, Inc., 17 Battery Place, New York, manufacturers of producer gas plants, has returned from France after nearly two years of service at the front. He will confine his activities chiefly to the management of the gas producer department.

The following officers of the Philadelphia Electric Steel Corporation have resigned to join the Triangle Engineering & Equipment Co., Philadelphia: A. S. Breithaupt, assistant general manager; T. B. McCabe, superintendent; F. H. Shaw, assistant treasurer.

Announcements have been issued by the Bethlehem Steel Co., Bethlehem, Pa., of the appointment of R. J. Wysor to be assistant general manager of the Sparrowspoint, Md., plant of the company to succeed M. J. Scammell, resigned. Mr. Wysor was transferred from the superintendency of the B. P. & N. E. Railroad of the company. Co-workers of his in the service department of the Bethlehem plant presented him a watch before his departure.

OBITUARY

NORMAN H. FAY, president of Fay & Scott, Dexter, Me., manufacturers of machine tools and special machinery, died suddenly at his home, June 13, aged 67 years. He had been in poor health for some time. Mr. Fay was born in Upton, Mass., March 9, 1852, the son of Winthrop B. Fay, who was a partner in the shoe manufacturing business of Goddard, Fay & Stone, Worcester, Mass., and the young man learned the shoe business in his father's factory, but later went to Hopedale, Mass., where he learned the machinist's trade. In 1875 he moved to Dexter and two years later formed with Walter Scott the firm of Fay & Scott, to operate a machine shop. They specialized on lathes and built up a large business in that product, but in later years went into special machinery, notably that used in the canning industry. In 1897 Mr. Fay became the head of the business, and upon the company's incorporation in 1901 was made its president. He was active in the affairs of his town and State. He was president of the First National Bank, the Dexter Trust & Banking Co. and the Dexter Loan & Building Association, and was chairman of the board of selectmen. He served in the Maine legislature from Dexter, and was in his second term as member of the governor's executive council. The handsome and costly N. H. Fay High School building is the gift of Mr. and Mrs. Fay. He leaves a widow, a son, Winthrop L. Fay, manager of Fay & Scott, and a daughter.

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GEORGE SMART

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British and American Costs

Iron and steel producing costs in Great Britain are understood to be, in the main, a trifle higher than American selling prices at works. If high ocean freights did not stand in the way there would be competition in the British home market which the British producers could not meet, and even as it is there are offerings of American unfinished and finished steel which are giving the British producers much concern. The offerings of American tin plate in Britain have resulted in a decision to send a joint commission of tin plate makers and workmen to the United States to ascertain how the thing is done.

British blast furnaces and steel mills have not lost such efficiency as they had before the war, while in the United States there has been no material increase in plant efficiency. In both countries the men employed are much the same men as before the war. Some change, however, must have occurred. Apparently that change is, speaking broadly, that the quantity of work done by the men for a certain amount of pay has decreased more in Britain than in the United States. In France the condition is worse than in Britain.

For recovery from the ravages of war, the killing and maiming of able workmen, the destruction of property and the destruction of capital through its being spent in war, human efficiency should increase, not decrease. Men should do more work, not less.

By the great majority of those who reflected on what was likely to occur after the war, the opinion was held that every one, from the most influential to the humblest, would be eager to rebuild and reconstitute the world, encouraged by the promise of a better world for which the war was fought. Better and harder work by the individual was expected. It has been learned lately that the expected mental attitude does not obtain. There is lowered morale, and there exists what amounts, in the final analysis, to a desire to live at somebody else's expense.

Such a condition could be borne much better by the United States than by Britain or France. The United States has grown richer; and while it would be imprudent to use our riches to have a good time, the thing could be done, while the riches lasted. Britain and France cannot do that,

because they have grown poorer; yet their workmen desire to do that very thing.

The principle of *laissez-faire* cannot be allowed to operate as a cure, because a worse disease would be fed. The United States cannot afford to rejoice at the crippling of competitors, but must rather help those competitors. There is no occasion to think that the United States would hold a less idealistic attitude toward after-war reconstruction problems than it had toward the war itself. The difference is not in the mental attitude of the people, but in the fact that for the war there was leadership. There were various arrangements by which team work could be done. For this new work there is, as yet, practically no leadership. Such leadership must be had. If it is not provided, Britain, France and Belgium will suffer grievously and eventually the United States will suffer also.

Compulsory Arbitration

Industry is vitally in need of the protection that can be procured only through the compulsory arbitration of disputes between owners and workers. At the present time it is too much, perhaps, to expect an application of this principle by law to disagreements with private concerns, but it is not too much to expect laws, both Federal and State, to establish compulsory arbitration for the public-service corporations. The effects of strikes that entail shutting off the service of such corporations may be very serious, for they hit in every direction. Railroads, both steam and electric, gas and electric plants, water works, telephone and telegraph lines, are all operated for the good of the public, and because of this communal interest are accorded rights in public streets and other exceptional privileges which otherwise would never be extended.

No just cause should fear the decision of arbiters. If a body of workers believe they should have more wages or shorter hours, or that discrimination has been shown in the treatment of some of their number, there should be no thought of shutting down a plant and thus depriving the people of the community which it serves of what it is their right to receive. The workers should welcome the legal right of appeal to a tribunal in the selection of which they have a voice. Experience

has proved that they are assured of fair treatment.

The recent telephone and telegraph strikes, the shutdown of street railroads, and the similar cutting off of other public utilities, are grossly unfair to the people as a whole, in whose hands rests the choice of representatives in the legislative bodies. Last week's flagrant instance in Worcester, Mass., points the moral. The employees of the local gas company refused the offer of the corporation to submit a dispute to the State Board of Conciliation and Arbitration and deliberately shut down the plant. The single day in which this city of 200,000 people was without gas proved the menace as it exists, and the imperative need of compulsory arbitration laws to protect the public interest. Departments of manufacturing plants using gas in their processes had to shut down. Workers went without hot food. The hospitals suffered cruelly. Such things should be impossible.

Compulsory arbitration laws, as applied to public-service corporations, would be constitutional, according to good legal opinion. Agreement to such a condition should be part of the contract of employment in the public utilities. Organized labor has no just reason for objecting; in fact, organized labor has usually resented precipitate action on the part of employees of these systems. Employer and employee should be entirely willing to create a condition where adjustments of differences are taken care of by an automatic system.

The X-Ray and Metallurgy

Progress in the examination of solid materials with the X-ray has been rapid in recent months and some surprising results have been recorded. This is particularly true of British and French research. The facts as brought out at a recent meeting in England are summarized on other pages of this issue.

One of the earliest applications of the X-ray to metallurgy was in the detection of flaws in steel and other metals. Recent experience shows that, with the present apparatus available, it is possible to detect very small flaws in steel two inches thick. London experimenters announce, however, that apparatus has lately been devised with which it is confidently expected to penetrate steel up to nine inches thick. French cast-steel brackets for gun carriages have been shown by this test to be faulty, and the method of manufacture was changed resulting in a correction of the defects. The entire internal structure of cart-ridges and high explosive shells has been profitably examined without injury to the object and welds have also been found imperfect by the same agency. The application of these developments opens up a wide field of advantage.

Still more interesting is the possible use of the X-ray in analysis. When the percentage of an element of high atomic weight such as tungsten is considerable, as in tool steel, the metal is not so permeable to the rays as when the percentage is low. It appears possible to apply radiography to rapid analysis in particular cases, as the separation of carbon from tungsten steel or the differentiation of various tungsten and alloy steels.

Another valuable development involves the examination of carbon electrodes for electric furnaces. The suggestion is made that the best use of radiographic examination would probably consist in systematic experiments on electrode manufacture where variations in composition, baking temperature, etc., would proceed step by step. International causes, resulting in premature and frequent breaking in service may thus be detected. Already the visual examination of aircraft timbers has yielded valuable results. No difficulty has been found in detecting concealed knots, resin pockets and grub holes, or excess or deficiency of glue in glued joints.

Examination of materials without destruction of the object has been a desideratum for many years. Its partial realization seems nearer as investigations proceed. Not only radiography but magnetic analysis are important factors in this evolution. Further work must decide to what degree these new developments in radiography will result in non-destructive testing. Already the results are striking and the goal nearer.

British Steel Export Position

The extent to which the war affected Great Britain's foreign trade in iron and steel is indicated by the statement that while such exports in 1913 averaged 420,757 gross tons per month, in 1918 they had dwindled to only 134,826 tons per month, or to less than one-third. In imports a still greater decline is recorded. In 1913, imports of iron and steel were 195,264 tons per month, but in 1918 they had fallen to only 28,543 tons per month.

The extent to which the resumption of an approach to peace conditions has affected British foreign trade in steel and iron is disappointing thus far. Official statistics for the first four months of this year are as follows, in gross tons:

1919	Exports	Imports
January	170,543	52,569
February	109,939	46,247
March	159,529	34,956
April	173,606	14,367

It will be seen that while the exports are above the 1918 average the revival has not been pronounced. The movement is even less than that of 1917, when the average was 195,400 tons per month. The shrinkage this year in imports is surprising, those for April having been only 50 per cent of the monthly average in 1918, and less than one-tenth of the pre-war imports.

The foreign steel trade of the United States so far this year presents a distinct contrast. Exports have been gradually increasing until in April they were over twice those of Great Britain, or 408,204 tons. This ratio applies to each month this year. Imports have maintained their position, and have been even larger each month than those of the British in April.

The conviction is forced that a resumption of normal conditions in Great Britain will be very slow, and the question is receiving earnest consideration from British economists, whether the former British supremacy in international steel trade can soon, if ever, be regained, with revolutionary

coal and labor costs and other problems confronting the industry and nation. The situation is ripe for American enterprise and co-operative effort.

Postponed Deflation

Whatever may have been the fact three months ago, there are few students of the business situation who now hold that there must be or will be a general and important decline in commodity prices and wages before the real business activity of the world will be resumed. From the present level no marked deflation need be expected in commodities and wages without corresponding decrease in the world's currency, government bonds and bank deposits, and in those items there is no present promise of more than a very gradual decrease. Any approximation to prices comparable with pre-war standards would require great increases in efficiency in production, or it might come after severe industrial depression, making men much more willing than they are at present to work very hard for what they secure in the commodities or services they purchase with their earnings.

This being the case, the individual who desires to take care of his future has a new duty to perform. Being convinced that business is going to proceed on something like the present basis of values, he adopts the policy of going ahead himself, but thereupon he must develop a judgment as to how long the activity is going to last, and what are to be the signs of its impending failure.

Obviously it will be dangerous to overestimate the duration of activity or to underestimate the possibility of adverse conditions developing. One danger clearly apparent now is that of concluding that "panics" are impossible under the Federal Reserve system of 1914. Every trade speaks its own language. Steel producers have one, bankers another. The great majority of bankers have been asserting that under the Federal Reserve system "panics" are impossible; but what they mean is simply a money panic. Panic is often described as sudden unreasoning fear, but as a matter of fact some of the historic panics have been based upon very reasonable fears indeed. As to the historic and original Black Friday of Dec. 6, 1745, there was nothing unreasonable in the fear that then prompted a raid on the Bank of England, for the army of the Pretender had its mind on the Bank of England, and that army was succeeding. It was not altogether unreasonable for men to be frightened when Overend, Gurney & Co., failed, producing the Black Friday of May 11, 1866, or when Jay Cooke & Co. failed, Sept. 18, 1873, or when Baring Brothers failed in 1890; nor is it at all clear that if the failure of these firms had been avoided or postponed matters would have been much better in the long run.

What the bankers mean is that the sudden unreasoning fear that causes runs on their institutions has been prevented by the Federal Reserve system, but there are other kinds of fear than fear as to the solvency of financial institutions. Usually the financial side of a panic is, indeed, but one symptom of something much

broader and deeper, something that would have its great manifestations nevertheless.

In 1867, a year and a half after the second "Black Friday," John Mills said: "As a rule, panics do not destroy capital; they merely reveal the extent to which it has previously been destroyed by its betrayal into hopelessly unproductive works." That is suggestive, but not accurately descriptive of the generally accepted view at the present time. Industrial depressions occur after more capital has been locked up in construction works than the average activities of men can guarantee a proper annual return upon. The works, generally, are not "hopelessly unproductive" but they have been created somewhat too soon, while on the other hand instead of panics not destroying capital, as Mr. Mills said, they do destroy capital to the extent that it has been sunk in enterprises that are afterward shown to have cost too much. A part of the capital really is destroyed, even though the work afterward begins paying returns, and its cost of duplication is restored because meanwhile several years of interest have been lost.

A money panic is not to be feared; but the panic is to be feared of the majority of men finding that they have been going too fast a pace, each following the example of others and assuming that the others are using their judgment. A sudden arrest in industrial progress can thus occur. Men may stop building railroads, or skyscrapers, or power plants, through reaching the conclusion that there are too many already. If they reach the conclusion suddenly and with one accord it is a panic, even if there be no great financial disturbance.

In war time it was common to say that when peace came some industrial reaction with declining prices was to be expected, followed by a period of great activity. Now that the idea of an early and general readjustment of prices has been given up, there is the disposition to think of it as something undesirable and to consign it to the indefinite future as part of the reckoning of the next period of depression.

S. F. Bowser Co., Ltd., Toronto, Can., manufacturer of gasoline and oil pumps, tanks and storage systems, has recently been reorganized to operate as a strictly Canadian organization, having heretofore been directed through the home office at Fort Wayne, Ind. H. C. Christie, sales manager, will have charge of the new organization. The plant is of heavy construction, commodious, with a large storage yard and good railway facilities. The total Canadian business last year amounted to more than \$500,000. Other officers are: Factory manager, E. E. Cummings; president, S. F. Bowser; vice-president, S. B. Bechtel; secretary, H. J. Grosvenor; treasurer, W. G. Zahrt.

The Westinghouse interests at Pittsburgh have abandoned temporarily the project for building homes for employees of the Westinghouse companies. Unexpected developments came up which the companies felt made necessary the giving up of the housing project for employees for the time being.

The Leesport furnace, owned by Frank Samuel and associates, Harrison Building, Philadelphia, who took it over last year, will be put in blast this week. It will make pig iron and ferromanganese. Its daily capacity is about 75 tons.

CORRESPONDENCE

Industries in Italy

To the Editor:

Dr. William Charles White of the Rockefeller Tuberculosis Foundation Commission, serving the American Red Cross, who has conducted an exhaustive investigation of the educational system of Italy, was recently quoted by the Rome correspondent of the Associated Press as saying:

"American influence in Italy must succeed German influence of pre-war days. American tools, machines and agricultural implements must replace the Teuton brands. American education must supersede Germanic education. The books from the shelves and libraries written in Italian to impress the Italian mind with Germany's greatness and superiority and German catalogs written in Italian must make room for new books in Italian of America's greatness and catalogs of American houses in Italian to preach American trade and commerce."

The above, together with the Vanderlip speech in New York, and articles of several writers who visited Italy during the war, shows a keener observation of its conditions by Americans and they realize that it is no more the "land of the dead" or the place to spend a honeymoon. From the foot of the Alps to the heel you can feel the pulsation of a new nation. New factories, mills, hydroelectric plants, etc., developed and expanded. Italy realizes that she can do without the Germans. Most of her industries, banks and navigation companies felt the influence of German domination. German influence began soon after her wars of independence when Italy badly needed foreign capital to get started to a new life. Conditions at the present time are almost identical except that you find her industries and commerce greatly developed and a united Italy with her people eager to get a share of the world's trade as a compensation for the sacrifices made during the war. Italy by her geographical location and influence is specially adapted for the near East trade.

But, besides supplying Italy with raw material and finished products during the period of reconstruction, Americans should look forward and take advantage of the change and development she is undergoing to plant new industries. By exploiting the versatility of Italian workmen and engineers and adapting American ingenuity and methods, America is sure to succeed.

America and other nations later on will find it very difficult to place finished goods on the Italian market. Italy wants and has to become a manufacturing and maritime nation.

The world market is big enough so that American and Italian interests should not come in conflict, and it would be quite easy to divide their spheres of activity.

Old Europe heavily invested in America; now that America paid the debt she is in position to invest in Europe.

MARCEL VISINTINI, M.E.

258 Conception Street,
Mobile, Ala., June 17, 1919.

Oxygen for Frozen Iron Notches

To the Editor:

Regarding the use of oxygen in blast-furnace practice as applied to the opening of frozen iron notches, etc., I would like to know of an instance where the practice dates back further than an application made by the writer in 1903. He was chemist at the Earlston furnace of Joseph E. Thropp, Everett, Pa., at the time and used in the laboratory a small tank of oxygen to burn off carbon, etc. The furnace had made a serious slip, blowing out the bell and doing other damage causing a long shutdown for repairs, with no extra coke in the bottom and a heavy burden on the furnace. Starting up after repairs, flushing out of a tuyere opening, etc., proved a serious proposition. A coal oil burner was applied to the cinder notch and had been operating a day or so with slow progress.

The use of oxygen suggested itself to the writer

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and he personally rigged up a ¼-in. black pipe with a short piece of hose. This brought results in a few moments, to the surprise of all. The oxidation of the pipe and any small pieces of coke present set up an intense heat that cut the frozen mixture of iron and cinder very rapidly. A new tank of oxygen was ordered to be used in opening the iron notch, but owing to the small output of oxygen and its limited use at that time the tank did not come in time to be used.

The writer thought of having his application patented, but did not have the necessary funds to do so, but has been using the process since that time.

E. P. Ross.

Superintendent Blast Furnace Department, Colonial Iron Co.

Riddlesburg, Pa., June 10, 1919.

The Zenith Iron Mining Co., recently incorporated at \$1,000,000, will operate the Zenith mine on the Vermilion range at Ely, Minn., which had been worked by the Oliver Iron Mining Co., Duluth, until the end of 1918. The new lease runs 50 years, the royalty to be based on the price of ore at Lake Erie ports. It will be payable this year on such ore as is mined, in 1920 it will be upon a minimum of 200,000 tons and for each year thereafter on 300,000 tons. It is estimated that there are 1,000,000 tons of high grade ore in sight. Officers of the new company are: President, R. B. Whiteside; vice-president, Thomas F. Cole; treasurer, Richard M. Sellwood.

Iron and Steel Markets

DEMAND INCREASING

Improvement in Steel More Pronounced

Structural Contracts in Larger Volume—Pig Iron Situation Stronger

Improvement in the steel situation is asserted in stronger terms this week. Mill schedules show it, particularly in the Central West. In a number of finished lines bookings are larger and the opinion has been ventured that May output will stand as the low record of the year.

Steel ingot production fell last month to an average of 85,000 tons a day, against 102,500 tons in April, a decrease of 17 per cent. The May rate represents about 26,000,000 tons a year, or about 55 per cent of the country's capacity.

In the Pittsburgh district steel mill operations of one large interest have advanced to a 75 per cent rate and preparations are making for the blowing in of one or two blast furnaces, whereas blowing out has been the rule. Some resale iron has been cleaned up, including a block of 19,000 tons held by a steel interest.

Wire, bars and structural shapes are active in the current buying and there is more disposition to contract for forward deliveries.

Chicago and Detroit continue to lead in structural work, the largest contract of the week being for 12,000 tons for the General Motors Corporation's office at Detroit. Another award is of 5255 tons for the Michigan Boulevard bridge over the Chicago River at Chicago. Three other projects there on which bids are pending call for 6800 tons. In the East for Navy Department needs awards amounting to 6500 tons are expected before July 1.

More Central Western sheet mills have reached an operation of 75 to 80 per cent. Automobile sheets figure more largely than ever, the country's daily output of automobiles and trucks being close to 5500. Terne plates are being bought by some of the motor companies in place of galvanized sheets and one recent contract was for 5000 tons.

The leading producer has been booking sheets for export of late at the rate of 1000 tons a day. Wire products are also an important item in the export trade, which in the main is made up of moderate tonnages in a variety of lines. Japan and South America are buying steadily. A sale of 1000 tons of heavy rails to Italy is reported at \$85, c.i.f.

Reductions of \$2 to \$3 in the ocean freight to the United Kingdom make British markets to that degree more accessible to American steel, a rate of \$17 on finished material from New York being now available and \$16 on pig iron. From Pensacola a rate of \$18 on pig iron to Mediterranean ports can now be had and of \$14 to Great Britain.

It is to be said, in view of all that has been put out lately concerning high costs of British steel, that the larger companies here seem little disposed to force American steel into British territory by

special concessions from the prevailing level in the domestic market. Not only is there no dumping, but the old type of aggressive competition is wanting.

Sales of Government steel are made from week to week. In the Chicago district 19,000 tons of ingots were disposed of at close to scrap values, the average being slightly over \$19.

The Federal Trade Commission, acting for the Railroad Administration, has called on the steel companies for new statements of rail mill costs. No such constructive object as the placing of additional rail orders is avowed, the performance having rather the effect of harassment.

The specially heralded drive for the organization of steel works labor is no new departure. For many months, and with all the help of the War Labor Board, the campaign to unionize the steel industry has gone on. The percentage of unemployment is a present handicap that did not exist in war time.

While the pig iron market is still active, the buying movement on the whole is less spirited than was the case two weeks ago. One or two districts report larger contracting. The American Radiator Co.'s buying has been less than reported in some quarters, a portion of the transaction being the taking back from the Government of a large tonnage which the company had turned over to the Government in war time. The limitation of pig iron output is more in evidence as a market factor, and it is significant that for forward delivery, quotations tend to be higher than for early shipment.

Pittsburgh

PITTSBURGH, June 17—(By Wire).

A leading local steel company reports that for the past eight weeks its new orders entered and sent to its mills for rolling, also its mill specifications, have shown a nice increase each week over the previous week. From about a 40 to 50 per cent operation two months ago its rate of general operations has advanced to 75 to 80 per cent, with two leading departments operating 90 per cent. While this case is exceptional, it indicates the general improvement that has come in the local steel trade, and this week reports are even more optimistic as to business coming in and the outlook than they have been at any time since the improvement for the better in steel started. There is no longer any talk of lower prices on pig iron, semi-finished steel or finished steel, but on the contrary, there is a good deal of talk about higher prices that may come very soon, if the present rate of increase in the steel business keeps up.

Some time ago pig iron was badly depressed, there being no demand, and a good deal of resale iron was being offered in the market, at as much as \$2 a ton below the prices adopted at Washington, effective from March 21. This resale iron has been pretty well cleaned up, including a block of about 19,000 tons held by Brackenridge steel interests, which acted as a menace over the local basic pig iron market for some months. There is an active movement in foundry iron, and a number of consumers are anxious to cover their needs

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	June 1, 1919	June 10, 1919	May 20, 1919	June 18, 1918
No. 2 X, Philadelphia...	\$29.50	\$29.50	\$29.50	\$34.25
No. 2 Valley furnace...	26.75	26.75	26.75	33.00
No. 2 Southern, Cincinnati...	28.35	28.35	29.35	35.90
No. 2, Birmingham, Ala...	24.75	24.75	26.75	33.00
No. 2, furnace, Chicago*	26.75	26.75	26.75	33.00
Basic, deliv., eastern Pa...	25.50	25.50	29.65	32.75
Basic, Valley furnace...	25.75	25.75	25.75	32.00
Bessemer, Pittsburgh...	29.35	29.35	29.35	36.30
Malleable, Chicago*	27.25	27.25	27.25	33.50
Malleable Valley...	27.25	27.25	27.25	33.50
Gray forge, Pittsburgh...	27.15	27.15	27.15	32.75
L. S. charcoal, Chicago...	38.85	38.85	38.85	37.50

Rails, Billets, Etc.,

Per Gross Ton:	June 1, 1919	June 10, 1919	May 20, 1919	June 18, 1918
Bess. rails, heavy, at mill...	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill...	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	38.50	38.50	38.50	47.50
O.-h. billets, Pittsburgh...	38.50	38.50	38.50	47.50
O.-h. sheet bars, P'gh...	42.00	42.00	42.00	51.00
Forging billets, base, P'gh...	51.00	51.00	51.00	60.00
O.-h. billets, Phila...	42.50	42.50	42.50	50.50
Wire rods, Pittsburgh...	52.00	52.00	52.00	57.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.595	2.595	2.595	3.685
Iron bars, Pittsburgh...	2.35	2.35	2.35	3.50
Iron bars, Chicago...	2.50	2.50	2.50	3.50
Steel bars, Pittsburgh...	2.35	2.35	2.35	2.90
Steel bars, New York...	2.62	2.62	2.62	3.095
Tank plates, Pittsburgh...	2.65	2.65	2.65	3.25
Tank plates, New York...	2.92	2.92	2.92	3.445
Beams, etc., Pittsburgh...	2.45	2.45	2.45	3.00
Beams, etc., New York...	2.72	2.72	2.72	3.195
Skelp, grooved steel, P'gh...	2.45	2.45	2.45	2.90
Skelp, sheared steel, P'gh...	2.65	2.65	2.65	3.25
Steel hoops, Pittsburgh...	3.05	3.05	3.05	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	June 17, 1919	June 10, 1919	May 20, 1919	June 18, 1918
Per Lb. to Large Buyers: Cents	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh...	4.35	4.35	4.35	5.00
Sheets, galv., No. 28, P'gh...	5.70	5.70	5.70	6.25
Wire nails, Pittsburgh...	3.25	3.25	3.25	3.50
Cut nails, Pittsburgh...	4.25	4.25	4.25	4.00
Fence wire, base, P'gh...	3.00	3.00	3.00	3.25
Barb wire, galv., P'gh...	4.10	4.10	4.10	4.35

Old Material Per Gross Ton:

Carwheels, Chicago	\$22.50	\$20.50	\$20.50	\$29.00
Carwheels, Philadelphia...	23.00	22.00	20.00	29.00
Heavy steel scrap, P'gh...	17.50	17.50	14.50	28.50
Heavy steel scrap, Phila...	16.00	16.00	15.00	29.00
Heavy steel scrap, Chicago	17.00	16.00	15.25	29.00
No. 1 cast, Pittsburgh...	19.00	19.00	17.00	28.50
No. 1 cast, Philadelphia...	22.00	22.00	21.50	29.00
No. 1 cast, Ch'go, net ton	21.00	19.50	19.50	27.00
No. 1 RR wrot., Phila...	21.00	21.00	21.00	34.00
No. 1 RR wrot., Ch'go, net	17.00	16.50	15.25	29.75

Coke, Connellsville,

Per Net Ton at Oven:	June 17, 1919	June 10, 1919	May 20, 1919	June 18, 1918
Furnace coke, prompt...	\$4.00	\$4.00	\$3.75	\$6.00
Furnace coke, future...	4.00	4.00	4.00	6.00
Foundry coke, prompt...	4.50	4.50	4.50	7.00
Foundry coke, future...	5.00	5.00	5.00	7.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	18.25	17.75	16.75	23.50
Electrolytic copper, N. Y.	18.00	17.50	16.50	23.50
Spelter, St. Louis...	6.50	6.30	6.25	7.75
Spelter, New York...	6.85	6.65	6.60	8.00
Lead, St. Louis...	5.10	5.00	5.00	7.75
Lead, New York...	5.35	5.25	5.25	7.82½
Tin, New York...	72.50	72.50	72.50	90.00
Antimony (Asiatic), N. Y.	8.37½	8.37½	7.75	13.50
Tin plate, 100-lb. box, P'gh...	\$7.00	\$7.00	\$7.00	\$7.75

over third quarter and last half of the year; in fact, are more anxious to cover than the furnaces are to sell them. One leading maker of foundry iron reports that it has now all the business in foundry pig that it can take care of up to October. There is very little activity in steel-making iron, but this will no doubt come along later. Billets and sheet bars are in limited demand, but there is a fair amount of activity in forging billets.

Nearly all lines of finished steel are much more active, with the exceptions of plates and tinplate, which are still dragging. Wire products, lap-weld pipe and oil country goods are in very heavy demand, with several mills making the latter products practically sold up for the rest of this year. The betterment in demand for scrap and also in prices noted last week still continues and consumers seem more anxious now to buy than dealers are to sell, the latter believing that prices will be higher in the very near future.

Coke is looking up a little in demand, and prices are firm. One large contract for furnace coke is about to be closed on the basis of six and a quarter tons of coke for a ton of basic iron, but there is another commodity involved in the deal, which really makes the transaction a trade. Other contracts for blast furnace coke are being negotiated, and will likely be closed this month. Predictions are freely made that operations in the local steel trade will soon be on an 85 to 90 per cent basis, and in the fall it is possible close to a 100 per cent operation basis will be reached. There is still talk of a shortage in labor to come in the fall, and this is advanced as one reason why there may be higher prices of steel late in the year. The claim is that if the mills have orders enough to get up close to a 100 per cent operation basis they will not be able to get enough men to run.

Pig Iron.—There has been more activity in the local pig iron market in inquiry and also in tonnage sold in the past week than in any one week for five to six months. This has been confined largely to foundry iron, but there has been some movement also in

malleable Bessemer, but very little in basic or Bessemer iron. Follansbee Brothers Co., operating an open-hearth steel plant at Follansbee, near Wheeling, W. Va., has bought about 3500 tons of basic for near by delivery, the iron reported having been sold by a nearby interest, which has a very low rate of freight. It is said the iron was sold at the Valley price of \$25.75, with actual freight to point of delivery added, which made the delivered price somewhat less than if the Valley freight rate had been charged. The Standard Sanitary Mfg. Co. has bought about 4000 tons of No. 2 foundry for its Northside Pittsburgh and New Brighton, Pa., plants. The business was divided between a local furnace and two Valley stacks. It is understood this iron was sold at the full price of \$26.75, Valley, but the furnaces that sold it have lower than the Valley freight. The National Radiator Co., at Johnstown, is credited with having bought 4000 tons of foundry, and another radiator interest about 1000 tons. It is estimated that upward of 35,000 tons of foundry iron have been sold in this market in the past 10 days. There is an inquiry here for 1000 tons of Bessemer for export, but nothing is known of the reported inquiry for 20,000 tons of basic iron for Wales. There has been so much activity in the local foundry pig iron market recently that there is some talk of higher prices on foundry in the near future. There are only three or four furnaces in this district making foundry iron and they are all reported pretty well sold up. The market is firmer than for some time, and we repeat former prices as follows:

Basic pig iron, \$25.75; Bessemer, \$27.95; gray forge, \$25.75; No. 2 foundry, \$26.75; No. 3 foundry, \$26.25, and malleable, \$27.25; all per gross ton at Valley furnaces, the freight rate for delivery in the Cleveland and Pittsburgh districts being \$1.40 per ton.

Ferroalloys.—The inquiry for ferroalloys is more active, especially for the lower grades of Bessemer ferrosilicon, and one producer of the latter has advanced prices sharply. About two weeks ago a local consumer picked up 300 tons of 50 per cent ferromanga-

nese at \$92 delivered, but to-day the market is very strong on resale ferromanganese at \$110 delivered, with most consumers holding for \$125 delivered, which is the producer's price. A Youngstown, Ohio, consumer has an offer out of \$110 for 300 to 400 tons of 78 to 80 per cent ferromanganese, but so far has not been able to obtain it at that figure. We are advised of the sale of 600 tons of 10 per cent Bessemer ferrosilicon for June and July delivery at the full price of \$49.75 at the furnace. Prices on all grades of ferroalloys are higher and very strong.

We quote 78 to 82 per cent resale ferromanganese at \$110 to \$115, delivered, with a reduction of about \$2 per unit for lower percentages. We quote resale 50 per cent ferrosilicon at \$85 to \$90 and resale 18 to 22 per cent spiegeleisen at \$35 to \$37, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, \$47.75; 10 per cent, \$49.75; 11 per cent, \$53.95; 12 per cent, \$56.35. We quote 6 per cent silvery iron, \$36.75; 7 per cent, \$38.50; 8 per cent, \$40.25; 9 per cent, \$42.25, and 10 per cent, \$44.75. About \$3 per gross ton advance is charged for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—There is more new inquiry and sales of forging billets than for re-rolling billets, or sheet bars. We note three or four sales of forging billets, aggregating upwards of 1000 tons at the full price of \$51, maker's mill. However, mills furnishing sheet bars on contracts to sheet and tin plate mills report that specifications are very much better, and some consumers are now anxious to contract for third and fourth quarter delivery, which they would not have thought of doing a few weeks ago. Sheet mills are now operating at between 75 and 80 per cent of capacity, largely on automobile sheets, so that consumption of sheet bars is much heavier now than a few weeks ago, when they were operating to only 50 per cent or less. There is no disposition whatever on the part of the steel mills to shade prices on either billets or sheet bars.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$38.50, 2 x 2 in. billets at \$42; sheet bars, \$42; slabs, \$41, and forging billets, \$51 base, all f.o.b. at mill, Pittsburgh, or Youngstown.

Plates.—Local mills do not report any improvement in the demand for plates, which is still quiet and not over 50 per cent of normal capacity of the mills. Practically no new cars are being built, and there is no word from the Government of any orders to be placed in the near future. In spite of the light demand, it is said the regular price on plates is being very well held, but is occasionally shaded from \$2 to \$3 per ton by a few of the smaller mills. We quote 1/4-in. and heavier tank steel at 2.65c. mills, Pittsburgh.

Structural Material.—Compared with the past three or four weeks, last week was quiet in the structural trade. The Fort Pitt Bridge Works has taken 200 tons for a new building for the Electric Steel & Forge Co., Cleveland, and the McClintic-Marshall Co. has taken 300 tons for machine and forge shops for Dilworth, Porter & Co., this city. Bids have gone in on about 4500 tons for the proposed new tire plant of the Kelly-Springfield Tire Co., Cumberland, Md. This job first came out more than two years ago, but was put off on account of war conditions, and has lately been revived.

We quote beams and channels up to 15 in. at 2.45c. at mill, Pittsburgh.

Sheets.—The demand for electrical sheets and also for long ternes, the latter being used almost exclusively now by automobile builders for certain parts of cars in place of galvanized sheets, is very heavy, and on these grades the mills that make them are sold up for three or four months. One recent contract placed by a leading automobile builder was for 5000 tons of long ternes, which went to a local mill. A recent compilation carefully made shows that at present there are being built in this country more than 5500 automobiles and trucks per day, which explains fully the present heavy demand for automobile sheets. Export inquiry for sheets is heavy and the leading interest is looking at the rate of over 1000 tons a day for export shipment. Last week the American Sheet &

Tin Plate Co. operated its sheet mills to about 74 per cent of capacity and will keep in operation two of its sheet mills which it contemplated shutting down on June 30 for repairs. This is on account of the heavy demand for sheets. Independent sheet mills are operating to about 75 to 80 per cent of capacity, and some mills making automobile sheets are sold up to from three to four months. There is still some shading in prices on one-pass black and galvanized sheets, but this is not very serious. Prices on sheets, as adopted on March 21, but which are sometimes shaded \$2 to \$3 per ton by some mills, are given on page 1678.

Tin Plate.—Operations among tin plate mills are showing a slight increase, due to a little better demand, but it is not believed that the tin plate business this year will be more than 60 per cent of what it was last year. The pack of fruit and vegetables will be much less than last year, owing to high prices, and the crop will be very late. Some fair-sized contracts for tin plate have been made for third quarter and last half delivery, and at the full price of \$7 per base box. The demand for terne plate is heavy, one leading maker reporting being sold up for four months. We quote production tin plate at \$7 per base box, f.o.b. Pittsburgh, but prices on stock items are being shaded 50c. to 75c. per box. Prices on terne plate as adopted on March 21 are given on page 1678.

Iron and Steel Bars.—The demand for steel bars is heavy, and mills are getting filled up for three and four months. Implement makers and other large consumers are now anxious to cover for their entire needs for third quarter and last half of the year, and some have done so at the full price of 2.35c. on steel bars rolled from billets. Prices on reinforcing bars are firmer, but are still being shaded by a few makers that roll them from shell steel discards. The demand for iron bars is also reported heavier than at any time for six months.

We quote steel bars, rolled from billets, at 2.35c., and from old steel rails 2.45c. Eastern mills are quoting iron bars for eastern shipment at 2.35c., while for western shipment 2.55c. Pittsburgh, is quoted. Pittsburgh mills rolling iron bars quote at 2.75c. Pittsburgh, plus full freight rate to point of delivery.

Wire Rods.—The demand is fairly active, and a good many rods are being sold for export. Two local mills that roll rods say that they are filled up on all the outside business they care to take to next October. We note sales of 1200 to 1500 tons of soft rods at \$52 per gross ton at mill, and a sale of about 300 tons of high carbon rods at about \$65 at mill. Prices on rods as adopted on March 21 last are given on page 1678.

Wire Products.—The demand for wire and wire nails continues very heavy and local mills and also the Youngstown interest are reported sold up for 90 days. On wire, several mills report they are back in shipments four to six weeks. Export demand is heavy, and large orders for wire and wire nails are being entered by local mills for shipment to India, South America and other foreign countries. It is said that on export business practically domestic prices are being obtained. Prices on wire products are very firm, except coated nails, which are still being shaded in the Chicago district about 10c. per keg. Prices as adopted March 21 are given on page 1678.

Hot-Rolled Strip Steel.—Some consumers are now anxious to cover for third quarter and last half, and some business has been closed. We quote hot-rolled strip steel at 3.05c. to 3.30c. per lb., f.o.b. mill, Pittsburgh.

Cold-Rolled Strip Steel.—The demand is heavier than for some time and some consumers are now covering for third quarter and last half of the year delivery. Prices are still being shaded to some extent. The price named below is that adopted on March 21.

We quote cold-rolled strip steel at \$5.65 base per 100 lb., f.o.b. Pittsburgh, for 1 1/2 in. and wider, 0.100 in. and thicker hard tempered in coils 0.20 carbon and under. Boxing charge 25c. per 100 lb.

Nuts and Bolts.—The demand is heavier than for some time and jobbers and consumers are now more inclined to buy ahead. Prices are firmer, but are still being shaded by some makers, either by allowing the freight or else making a cut of 2 1/2 to 5 per cent on

the regular discounts. These discounts on nuts and bolts are those adopted on March 21 and are given on page 1678.

Shafting and Screw Stock.—A good part of the demand for shafting and screw stock is still coming from automobile builders and from concerns that build automobile parts, but represents only 35 to 40 per cent of normal capacity.

Hoops and Bands.—Mills rolling hoops and bands report the demand better, and say that customers are now willing to contract for third quarter and last half delivery, and a few contracts have been closed at the full price. We quote hoops and bands at 3.05c., Pittsburgh, plus usual extras.

Spikes.—The demand for all kinds of spikes is light. The railroads are placing very few orders, and the demand for boat spikes is also limited, as very few wooden boats are being built. It is said prices are being firmly held on the small amount of new business being placed.

We quote standard spikes, 9/16 x 4½ in., and also small spikes, \$3.35 base per 100 lb. in carload lots of 200 kegs or more plus usual extras. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more.

Boiler Tubes.—The demand for locomotive tubes is reported better, but for merchant tubes is light. Discounts on iron and steel tubes, as adopted March 21, are given on page 1678.

Iron and Steel Pipe.—On lap weld pipe and also on oil country goods, the demand is enormously heavy, and three or four of the larger mills report that they are practically filled up for the remainder of this year. Some very large contracts for gas and oil lines are being placed and others are under negotiation. The Lone Star Gas Co. has placed 150 miles O D line pipe, sizes 12¼ up to 18 in. with the National Tube Co., and also about 110 miles of 6½ to 10¼ with two other mills, all for this year delivery. The Gulf Pipe Line has placed 60 miles of 10-in. with a local mill and a Youngstown interest. The Oklahoma Natural Gas Co. has placed 35 miles of 16-in. pipe with the National Tube Co. and is still in the market for 15 miles of 12¼-in. The Texas Co. of New York is in the market for 100 miles of 12-in. and smaller pipe, and another interest is in the market for 35 to 40 miles of 6½-in. casing and larger sizes. The demand for oil country goods is so heavy that mills are not willing to commit themselves any further than they are compelled, and an advance in prices in the near future is not an improbability. The demand for butt weld sizes is heavier than it has been for some months. Pumping supply houses and jobbers held off buying for some time, but are now sending in orders freely, and for as quick shipment as the mills can give them. The export demand for pipe is also heavy and regular shipments are being made to India, South America and other foreign countries. Pipe mills are now operating at 85 to 90 per cent of normal capacity and have orders ahead for three or four months. Discounts on iron and steel pipe, as adopted on March 21 are given on page 1678.

Coke.—A number of contracts for blast furnace coke for third quarter and last half of the year delivery are under negotiation and will likely be closed during this month. These will probably be on the basis of six or six and a quarter tons of coke to a ton of basic iron. Surplus coke has been pretty well cleaned up and prices are very firm. We now quote standard make of blast furnace coke at \$4 to \$4.25, while some consumers are paying \$4.50 for their coke this month per net ton at oven. Best grades of 72-hr. foundry coke are \$4.50 to \$4.75, while it is said contracts for very high grades of foundry coke for last half of the year have been made at \$5 to \$5.50 per net ton at oven. The output of coke is growing and last week the Upper and Lower Connellsville regions turned out 117,655 tons, an increase over the previous week of over 6000 tons.

Old Material.—The betterment in the scrap trade noted in this report last week still continues and there is more disposition on the part of consumers to buy than among dealers to sell, the latter believing that

prices on scrap will be higher in the near future. One leading consumer has been unable to get heavy melting steel scrap at the price it offers, and has lately started one of two blast furnaces to make up a shortage in scrap, increasing its mixture in its open hearths and decreasing it in scrap. We note sales of 1500 tons of selected heavy steel melting scrap at \$17.50 per gross ton delivered and 500 tons of low phosphorus scrap, consisting of bloom, billet and plate ends, at \$22.25 per gross ton delivered. Prices are very firm, but not any higher than last week.

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$17.50 to \$18.00
No. 1 cast, for steel plants	19.00 to 19.50
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	19.00 to 20.00
Compressed steel	14.50 to 15.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	13.50 to 14.00
Bundled sheet stamping	12.00 to 12.50
No. 1 busheling	14.50 to 15.00
Railroad grate bars	15.00 to 16.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ½ in. and heavier	23.00 to 24.00
Iron car axles	29.00 to 30.00
Locomotive axles, steel	29.00 to 30.00
Steel car axles	26.00 to 27.00
Railroad malleable	16.00 to 16.50
Machine shop turnings	9.50 to 10.00
Cast iron wheels	22.00 to 23.00
Roller steel wheels	19.00 to 20.00
Sheet bar crop ends (at origin)	19.00 to 19.50
Heavy steel axle turnings	13.50 to 14.00
Heavy breakable castings	19.50 to 20.00
Cast iron borings	11.25 to 11.50
No. 1 railroad wrought	19.50 to 20.00

British Iron and Steel Market

Demand Increasing—Pig-Iron Scarce—Price Reductions Unlooked for—Luxemburg Furnaces Stopped.

(By Cable)

LONDON, ENGLAND, June 16.

Demand for pig iron is increasing, but the scarcity of foundry grades continues. Current prices are being paid up to the end of the year, consumers not anticipating any reduction. Exports are extremely restricted in the absence of supply and licenses.

The general trade position in steel is unaltered, but demand seems to be increasing, especially for shipbuilding material.

The following Luxemburg plants have suspended operation owing to a lack of coke: Thyssen & Co., Rombacher Huettten Werke and the furnaces at Hagendingen and Aumetzfriede. The Gelsenkirchen works in Lorraine have been sequestered and financial difficulties are feared unless the sale of the company's properties on the left bank of the Rhine is ratified.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalents figured at \$4.60½ for £1:

Pig iron	f	s.	d.	f	s.	d.	
East Coast Bessemer	9	10	0	9	12	6	\$43.74 to \$44.34
West Coast Bessemer	9	5	0	9	10	0	42.63 to 43.74
Cleveland No. 3 foundry	8	0	0	8	5	0	36.84 to 37.99
Cleveland basic	8	5	0	8	10	0	37.99 to 39.14
Coke (Durham):							
Furnace	1	19	0				8.98
Foundry	2	4	0				10.13
Ferromanganese	25	0	0				115.12
Billets	14	10	0	14	15	0	66.77 to 67.92
Tin plate and sheet bars	13	15	0	14	0	0	63.31 to 64.47
Rails, 60 lb. and upward	15	0	0	15	5	0	69.07 to 70.22
Steel bars	19	0	0	20	10	0	Cents per lb. 3.90 to 4.20
Large rounds, etc.	17	2	6	18	10	0	3.51 to 3.70
Structural material	16	10	0	17	0	0	3.38 to 3.49
Plates	17	10	0	17	15	0	3.59 to 3.64
Plates, boiler	19	10	0				4.02
Bar iron	20	10	0	21	0	0	4.21 to 4.32
Tin plates, 14 x 20, coke 1	13	0	0				\$7.60
112 sheets, 10½ lb., f.o.b. Wales							

Chicago

CHICAGO, June 17.

It is difficult to gage the improvement in general business over a month ago, but in some quarters it is placed as high as 50 per cent. Industries generally are reviving and activity in all lines of iron and steel production would be assured if the agricultural implement manufacturers and the railroads would purchase their requirements. There are indications that the former may enter the market at an early date. Among finished materials structural shapes continue active. While lots of good size individually are being placed and are in prospect, the greatest source of encouragement to the mills is the steady increase in the aggregate of orders from warehouses and fabricators to replenish exhausted stocks. Wire products and bolts and nuts are very active, and mild steel bars are improving. Buyers in increasing numbers are asking for contracts to protect themselves against possible advances. Mill operation has improved slightly. The leading independent is operating at nearly 80 per cent of capacity and the foremost interest at about 60.

Pig Iron.—There continues to be a healthy buying movement, numerous contracts being placed for third and fourth quarter requirements. Inquiries are followed by prompt purchases, in contrast with the dickering which generally obtained when consumers entered the market during the dull period which closed a few weeks ago. Foundry iron is selling in round tonnages ranging from 500 to 3000 and 4000 tons and over. Considerable malleable business also is being booked. Charcoal iron is more active. Numerous inquiries for encouraging tonnages are before the trade, among them one for 4000 tons. It is difficult to determine the market price of copper free low phosphorus. Some producers are still asking \$46.75, furnace, while others are offering varying concessions. It is believed, however, that \$40 furnace is about the lowest price now quoted. Jackson county furnaces have raised the differential between 6 and 7 per cent silvery from \$1 to \$1.50, making the furnace quotation for 7 per cent \$38.25. This step was taken because the difference of \$1 was disproportionate to the differentials between the higher grades, which are from \$2 to \$2.50. Southern furnaces which have been absorbing freight to Northern points on foundry grades are reaching the point of satiety as far as business on that basis is concerned. Another Southern producer was withdrawn from the market and the remaining furnaces selling on a Chicago base are restricting their sales almost entirely to iron running higher than 2½ per cent silicon. The large stocks of foundry on furnace banks in this district have practically been absorbed as the result of the business done within the last few weeks. The Iroquois Iron Co. is preparing to blow in another stack in the near future. There is considerable talk of possible price advances current. It is pointed out that labor trouble at the mines and a probable concentration of demand for coal in the fall portend an increase in the price of foundry coke. Coke is more active in this market than it has been for some time. One inquiry for 5000 tons is before the trade.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, average silicon, 1.50 second half delivery, f.o.b. furnace, average freight to Chicago \$2.50 (other grades subject to usual differentials).....	\$29.25
Lake Superior charcoal, first half, nominal.....	38.85
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	28.00
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	26.75
Northern high-phosphorus foundry.....	26.75
Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25	29.75
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	28.00
Southern foundry, silicon, 1.75 to 2.25.....	26.75
Malleable, not over 2.25 silicon.....	27.25
Standard Bessemer	27.95
Basic	25.75
Low phosphorus (copper free)	40.00
Silvery, 7 per cent	42.05

Ferroalloys.—Resale stocks of both ferromanganese and spiegeleisen have practically disappeared and higher prices are expected. There is no activity in ferrosilicon.

We quote 80 per cent ferromanganese at \$125, delivered; 50 per cent ferrosilicon, resale, at \$110, delivered; spiegeleisen, 18 to 22 per cent, \$31 furnace.

Plates.—Although one interest has booked sufficient business to insure mill operation during the remainder of this month and through July, operating reports from other sources are not so encouraging. Two more ships in the Pacific Coast construction program have been reinstated. The steel, amounting to 7000 tons, about two-thirds of which consists of plates and the remainder shapes and bars, has been awarded to the leading interests. The Polish Government is inquiring for 1000 light box cars similar to the equipment used on Russian railroads.

The mill quotation is 2.65c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Structural Material.—Two of the largest fabricating awards placed for some time are included in the business closed during the past week. Both of them, one amounting to 12,000 tons for the General Motors Corporation monumental office building in Detroit and the other 5255 tons for the Michigan Boulevard link, Chicago, were let to the American Bridge Co. Other recent awards include:

Argo, Ill., plant Corn Products Refining Co., 700 tons, divided between South Halstead Iron Works, the Vierling Steel Works and the Duffin Iron Co.

American Wire Fabric Co., Blue Island, Ill., 400 tons, to Gage Structural Steel Co.

Moline Plow Co., Moline, Ill., 475 tons, to Toledo Bridge & Crane Co.

Power house in connection with new body plant Chevrolet Motor Co., St. Louis, 300 tons, to American Bridge Co.

Blast furnace flue, International Smelting Co., Tooele, Utah, 165 tons, to Minneapolis Steel & Machinery Co.

Tractor plant for Graham Brothers, Evansville, Ind., 950 tons, to Lackawanna Bridge Co.

Lehigh Portland Cement Co., Mitchell, Ind., 400 tons to Lackawanna Bridge Co.

Lehigh Portland Cement Co., Oglesby, Ill., 450 tons, to the Worden-Allen Co.

Pulp and paper mill plant, Power & Paper Co., Escanaba, Mich., 400 tons, to Worden-Allen Co.

Addition to Bucyrus Co. plant, South Milwaukee, Wis., 200 tons, to Worden-Allen Co.

Machine shop addition, Stover Engine & Machinery Co., Freeport, Ill., 100 tons, to Worden-Allen Co.

Bids were closed to-day on 2500 tons for the Northwestern Telephone Co. building, Minneapolis, Minn. Revised bids were taken to-day on 3000 tons for the John Crerar Library, Chicago. About 700 tons for the Federal Reserve Bank, Dallas, Texas, are expected to be let the end of this week. Armour & Co. which recently called for tenders on 1250 tons for a power plant at Kansas City, Kan., has revised the original plans and are now asking for bids on only 575 tons. Bids are being taken on 2000 tons for the Webster Hotel, Chicago. Fabricators are also figuring on 250 tons for a bascule bridge at Main Street, Kenosha, Wis. Plans are now being prepared for an addition to the Chicago Beach Hotel, Chicago, to cost \$2,000,000.

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for material out of warehouse.

Sheets.—The volume of business continues to increase, but mill operation of late has been impeded by the hot weather, a few mills having been forced to shut down temporarily. While there is still shading on the part of some makers, its importance in relation to the total business placed is diminishing.

Mill quotations are 4.35c. for No. 28 black, 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized.

Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.57c.; No. 28 black, 5.37c., and No. 28 galvanized, 6.72c.

Bars.—Mild steel bar mill operation probably averages about 70 per cent of capacity, although one interest reports a considerably better record. The rail-carbon steel situation is not generally so good, although it is gradually improving. An important mill which,

for an extended period, operated from week to week and booked about enough business each week to insure operation the next, is now on a month to month basis. Bar iron business is dull and is not expected to revive until the railroads commence to buy. Agricultural implement manufacturers continue to buy bars sparingly.

Mill prices are: Mild steel bars, 2.35c. Pittsburgh, taking freight, rate of 27c. per 100 lb.; common bar iron, 2.50c. to 2.60c. Chicago, rail carbon, 2.45c. mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Wire Products.—The demand for all classes of material is unusual for this time of the year, but is explained by the postponement of purchases during the spring when the price situation was uncertain. Buyers in increasing numbers are asking for contracts. Mills would be running full if they could secure sufficient labor. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1678.

Rails and Track Supplies.—The Chicago Union Station Co. has awarded 200 tons of 130-lb. rails to an Eastern mill. An order for 1000 tons of track specialties has been taken in this district. In general, however, track supplies are dull.

Standard railroad spikes, 3.35c. Pittsburgh. Track bolts with square nuts, 4.35c. Pittsburgh. Steel tie plates and iron angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 2.75c. f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Bolts and Nuts.—Contracts are being booked in increasing numbers and in most cases buyers wish to cover their requirements for from three to six months. Mill operations are full and an advance in prices within the next 30 days is predicted in some quarters. Agricultural implement manufacturers are beginning to buy rather freely. In fact, it is believed farm implement makers have camouflaged the actual condition of their business. A conservative manufacturer who recently placed a contract for his last half requirements calling for twice the amount of bolts, nuts and rivets he purchased during the first half states that his production during the next six months will be limited only by his ability to secure adequate labor. For mill prices see finished iron and steel f.o.b. Pittsburgh, page 1678.

Structural rivets, 4.72c.; boiler rivets, 4.82c.; machine bolts up to $\frac{3}{8}$ x 4 in., 50 and 10 per cent off; larger sizes, 40 and 10 off; carriage bolts up to $\frac{3}{8}$ x 6 in., 50 and 5 off; larger sizes, 40 off; hot pressed nuts, square tapped and hexagon tapped, \$2 off; coach or lag screw, gimlet points, square heads, 50 and 10 per cent off. Quantity extras for nuts are canceled.

Cast Iron Pipe.—The tone of the market continues optimistic because of the encouraging amount of business in prospect. A few small mills have been offering slight concessions of late. Recent awards include:

Detroit, 2700 tons of 6 and 8-in. pipe, to the Lynchburg Foundry Co., Lynchburg, Va.

Detroit, 475 tons of high pressure pipe to the United States Cast Iron Pipe & Foundry Co.

Minneapolis, 150 tons, to the Lynchburg Foundry Co.

Schererville, Ind., 100 tons, to the Lynchburg Foundry Co.

Dearborn, Mich., will let 800 tons on June 18, and Lusk, Wyo., will take bids on 500 tons on June 23.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in. \$54.80; 6-in. and larger, \$51.80; class A and gas pipe, \$1 extra.

Old Material.—Consumers are still timid about entering the market, although a few have bought small tonnages. There is a growing feeling of optimism among the dealers, however, who are bidding up prices in connection with the purchase of railroad and Government scrap in anticipation of heavy buying by mills and foundries in the near future. The activity among the dealers has resulted in advances in most items of from \$1 to \$2 per ton. Considerable scrap is now being disposed of by the Chicago office of the Ordnance Department of the Army. Briggs & Turivas recently purchased 24,000 tons of defective shells and have resold practically the entire tonnage. Today the Government sold 10,000 tons of ingots at \$19.11½ per gross ton and 6929 gross tons at \$18.97. The Ordnance Department

requires a 10 per cent deposit with each bid. The Chesapeake & Ohio Railroad has issued a small list.

Per Gross Ton

We quote delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Iron rails	\$21.00 to \$22.00
Relaying rails	35.00 to 45.00
Carwheels	22.50 to 23.50
Steel rails, rerolling	19.50 to 20.00
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.00 to 17.50
Shoveling steel	15.75 to 16.25

Per Net Ton

Iron angles and splice bars	\$19.00 to \$20.00
Steel angle bars	17.00 to 17.50
Iron arch bars and transoms	23.00 to 24.00
Iron car axles	28.50 to 29.50
Steel car axles	25.50 to 26.00
No. 1 bushing	14.50 to 15.00
No. 2 bushing	10.50 to 11.00
Cut forge	15.50 to 16.00
Pipes and flues	13.25 to 13.75
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	15.75 to 16.25
Steel knuckles and couplers	16.75 to 17.25
Coil springs	18.25 to 18.75
No. 1 cast	21.00 to 22.00
Boiler punchings	20.00 to 21.00
Locomotive tires, smooth	17.50 to 18.00
Machine shop turnings	6.50 to 7.00
Cast borings	9.50 to 10.00
Stove plate and light cast	17.00 to 17.50
Grate bars	16.00 to 16.50
Brake shoes	15.00 to 15.50
Railroad malleable	16.00 to 17.00
Agricultural malleable	16.00 to 16.50
Country mixed	12.00 to 13.00

Philadelphia

PHILADELPHIA, June 17.

Steel companies report an expanding demand for billets, bars, structural shapes and wire products, with very little activity in plates. As compared with a few weeks ago, conditions in the steel trade are generally described as better. Export orders have included 5000 tons of skelp and 2000 tons of galvanized wire. Orders of this size, while not notable in normal times, have been conspicuously absent in the export trade in recent months. A domestic sale of 1550 tons of billets and 900 tons of slabs in this district is reported by an Ohio mill.

Foundry pig iron demand is broadening moderately, some contracts being closed covering deliveries into fourth quarter. Prices for future delivery show a slight upward tendency.

Scrap is increasing in strength despite the lack of buying interest among the mills.

Pig Iron.—There is a moderate increase in sales of foundry iron, but no general buying movement is in evidence. Many consumers are still indifferent as to covering for third quarter or last half requirements despite the views of sellers that prices will henceforth show an upward trend. Although No. 2 plain iron for prompt delivery is still obtainable at \$28.50 or less, and No. 2 X for \$29.50, delivered Philadelphia, sales of these grades for third quarter and throughout the second half have been made at higher prices. A Lehigh Valley furnace has sold several lots, one of 1000 tons, at \$29.60 for No. 2 plain and \$30.10 for No. 2 X, delivered Philadelphia. One furnace interest which has been weak on prices has advanced its foundry iron quotations \$2 a ton. On the other hand, there are still sales of low-priced iron, several hundred tons of No. 1 foundry (2.75 to 3.25 per cent silicon) having gone to a Baltimore consumer at about \$29, delivered. The fact that some sellers are able to get more is an indication that the market is weak only in spots. Sales of foundry iron in the past week have amounted to many thousands of tons. For some sellers it was the best week this year. Basic iron is still available at about \$25.50 to \$26.00, Philadelphia, but no sales are reported for the past week. Low phosphorus is still quotable at \$35 for copper bearing and \$38 for copper free, f.o.b. furnace. We quote standard grades of iron delivered

Philadelphia except low phosphorus, which is sold f.o.b. furnace:

Eastern Penna. No. 2 X (2.25 to 2.75 sil.)	\$29.50 to \$30.10
Eastern Penna. No. 2 plain (1.75 to 2.25 sil.)	28.50 to 29.60
Virginia No. 2 X (2.25 to 2.75 sil.)	30.60
Virginia No. 2 plain (1.75 to 2.25 sil.)	29.60
Basic	\$25.50 to 26.00
Gray forge	25.50 to 26.00
Standard low phosphorus (f.o.b. furnace)	38.00
Copper bearing low phosphorus (f.o.b. furnace)	35.00

Ferroalloys.—The market for ferromanganese shows a stiffening tendency, carload lots of resale material having been sold at \$115 and \$120, delivered, which is higher than has been obtainable in some time. Producers are still asking \$125, delivered, but are booking only occasional carload orders at this price. It is not expected that British producers will be able to take much business at their new price of \$121, Atlantic seaboard, as there appears to be no question that American producers would meet the British quotation for delivery at steel plants when it happened to fall below \$125, as would be the case near seaboard. Spiegeleisen, 18 to 22 per cent, is quoted at \$35, furnace, but few sales are being made.

Billets and Slabs.—An Ohio mill has sold in this district 1550 tons of rerolling billets and 900 tons of slabs, but generally, the market is not active, the tonnage above mentioned being among the largest for domestic use that have been booked in this market this year. We quote open-hearth rerolling billets at \$42.50, Philadelphia, and slabs at \$45, Philadelphia.

Plates.—Of all rolled steel products, plates are least in demand. Prospects of better business within the near future are noted by the mills, but orders are difficult to close. Whatever weakness in prices exists is more in evidence in plates than in any other steel product, though there has not been enough business of late in this market to bring out any substantial reductions from the mills. An eastern Pennsylvania mill has booked 5000 tons of skelp for export. We quote sheared plates ¼ in. and heavier at 2.895c., Philadelphia.

Structural Material.—There is a better run of small orders for shapes. The Cambria Steel Co. accumulated a sufficient number of orders to operate its shape mills at Johnstown, Pa., this week at nearly full capacity. No large inquiries are in the market with the exception of 4000 tons wanted by the Kelly-Springfield Tire Co. for a new plant in the East. Fabricators are exceptionally busy figuring on building jobs, so much so that some of them have been employing more draftsmen and detailers. Much of this prospective building is not definitely decided upon yet, but probably will be in the near future. We quote plain material at 2.695c., Philadelphia.

Sheets.—Manufacturers of sheets are accumulating stocks in anticipation of a general strike of sheet mill workers on or about July 1. The mills which abide by the Amalgamated scale are said to be preparing to resist the proposed attempt of the union to force a 6-hr. day and a minimum wage scale based on present selling prices. The demand for sheets is not large, but makers are urging their customers to place orders before the first of the month, predicting that in the event of a general strike the mills will be inactive possibly for months. We quote No. 10 blue annealed sheets at 3.795c., No. 28 black at 4.595c., and No. 28 galvanized at 5.945c., all Philadelphia.

Bars.—Jobbers have been buying steel bars both for prompt shipment and for future delivery in a fairly liberal way, business in bars being much better than in most of the steel products. The Cambria Steel Co. is running its bar mills at Johnstown, Pa., this week at 75 to 85 per cent of capacity. Bar iron is not very active. We quote soft steel bars and bar iron at 2.595c., Philadelphia, double refined bar iron being quoted 1c. a lb. higher.

Wire Products.—A Western Pennsylvania steel plant is running its wire department practically at 100 per cent capacity this week, its orders for wire prod-

ucts having shown a healthy growth in the past few weeks. Among recent orders is one for export of 2000 tons of galvanized wire. Jobbers are buying nails, plain wire and barbed wire for prompt shipment and on contract for future delivery.

Bolts, Nuts and Rivets.—Price cutting on bolts and rivets continues to be reported, an extra 5 per cent being easily obtainable and on desirable orders even more is being granted by some sellers. A Delaware River shipbuilding company is inquiring for 168,000 miscellaneous bolts and the Pennsylvania Railroad will buy 200,000 heat-treated track bolts.

Old Material.—Despite the fact that mills and foundries are not actively buying, the market for scrap shows an upward trend, this being based largely on transactions among dealers; also on the strength shown in the Pittsburgh market during the past week or two. Two or three Eastern mills will pay \$16 or \$16.50 for No. 1 heavy melting steel, but scrap dealers are not willing to sell at either price. No offer higher than \$16.50 has been heard in this market. Small sales of car wheels, low phosphorus scrap, turnings and other grades have been sold and in each instance prices were higher than on the last reported sales. Scrap dealers are complaining of the treatment they are accorded by the Ordnance Department in submitting bids for Government scrap. In several cases, the Ordnance Department officials have arbitrarily thrown out bids because in the opinion of these officials they were not high enough. We quote for delivery at consumer's works in eastern Pennsylvania as follows:

No. 1 heavy melting steel	\$16.00 to \$17.00
Steel rails, rerolling	18.00 to 18.50
No. 1 low phosphorus, heavy, 0.04 and under	23.00 to 24.00
Iron rails	21.00 to 22.00
Car wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	20.00 to 21.00
Country yard wrought	12.00 to 15.00
No. 1 forge fire	13.00 to 13.50
Bundled skeleton	13.00 to 13.50
No. 1 busheling	15.00 to 16.00
No. 2 busheling	13.00 to 14.00
Turnings (short shoveling grade for blast furnace use)	12.00 to 13.00
Mixed borings and turnings (for blast furnace use)	11.00 to 11.50
Machine-shop turnings (for rolling mill use)	12.00 to 13.00
Cast borings (clean)	13.00 to 13.50
No. 1 cast	22.00 to 23.00
Grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Railroad malleable	18.00 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.50 to 18.50
Ungraded pipe	13.00 to 14.00

Birmingham

BIRMINGHAM, ALA., June 16.

Pig Iron.—With what price is required to land the business at the point of delivery as the ultimate basis, the Southern iron market has gone through two to three weeks of considerable activity until recapitulation of estimated sales in that period forces the conclusion that bookings have reached considerably over 100,000 tons and may be nearer 150,000. Two companies report bookings of yard stocks and three months' present capacity output with the exception, in one case, of high silicon and in the other of low silicon. Sales prices of \$24.75, \$25, and as high as \$25.75 are quoted. One interest puts it this way: "We have no fixed basis. We get what our competitors and conditions allow." That is about the size of it. The bulk of business has been in St. Louis and Chicago territory and based on the difference between freight rates of \$2.00 and \$4.30, and in Southern territory, where the melt is considerably on the increase. The general f.o.b. furnace basis in Birmingham may be said to be \$24.75. The market is strong at present prices. One interest reports the shipment daily of twice its one-furnace output and has already reduced yard stocks by 8,000 tons. The total of yard holdings is much below 100,000 tons of foundry and is being rapidly depleted. Ocean freights are easing, Pensacola offering \$18 to the Mediterranean during

the week. A little more concession and there will be considerable export business. Steel men say there has been much improvement, owing to conviction that lower prices will not be obtainable and an increasing demand for nails and wire. Pipe shops are buying more iron. Stove foundries are working to capacity with no stocks on hand and a brisk demand obtaining the past 30 days. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, 1.75 to 2.25 silicon.....	\$24.75
Basic	23.75

Cast Iron Pipe.—The sanitary pipe trade has greatly improved; so much so that operations are to capacity permitted by the limited supply of expert labor. Pipe brokers report an increasing demand in response to more active building operations. Statesville, N. C., has placed 700 tons of water pipe with the Lynchburg company and a Birmingham interest thinks it has landed a 1000-ton order from Guthrie, Okla. A local order of 1300 tons for an industrial plant is about to be placed.

Coal and Coke.—Domestic coal continues in strong demand and steam coal is brisker. The Alabama Co. has fired 70 additional ovens to meet the increased demand for 72-hr hand-picked coke. Foundry coke is in strong demand and the price is \$8.

Old Material.—The market is active so far as cast scrap is concerned, but dealers decline to sell heavy melting steel at present offerings of consumers and are piling it up in apparent confidence of higher prices. The tone is more buoyant than in several months. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	\$12.00 to \$14.00
No. 1 heavy steel.....	12.00 to 13.00
Cast iron borings.....	6.50 to 7.50
Machine shop turnings.....	6.50 to 7.50
Stove plate	15.00 to 16.00
No. 1 cast	20.00 to 22.00
Carwheels	20.00 to 22.00
Tramcar wheels	20.50 to 22.00
Steel axles	18.00 to 20.00
No. 1 wrought	12.50 to 13.00

Buffalo

BUFFALO, June 16.

Pig Iron.—Strong interest on the part of consumers continues to be shown in pig iron in this district. Sales have been numerous and some of them for heavy tonnages, although the aggregate reported is not quite as large as for the preceding week. The iron taken was comprised almost entirely of foundry and malleable grades, and the resulting situation has caused at least one producing interest to advance the price for the two lower silicon grades of foundry iron 25c. per ton. Another interest reports sales of 7,000 tons of malleable iron at \$27.75.

The betterment in the situation is also reflected in shipments, for they have increased to a marked extent during the last week. The interest on the part of buyers is also spreading to coke, and they are now placing contracts for their needs through the remainder of the year. It is thought the present price basis may not remain in effect much longer considering the shortage of labor becoming accentuated in the coke fields. We quote as follows, f.o.b. furnace Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon.....	\$29.75
No. 2 X, 2.25 to 2.75 silicon.....	28.00
No. 2 plain foundry, 1.75 to 2.25 silicon	\$26.75 to 27.00
Gray forge	25.75 to 26.00
Malleable, silicon not over 2.35.....	27.25
Basic	25.75
Basic, 1 to 1½ per cent manganese.....	26.25
Basic, 1½ to 2½ per cent manganese.....	26.75
Bessemer	27.95
Lake Superior charcoal, regular grades, f.o.b. Buffalo.	32.35

Finished Iron and Steel.—Orders and contracts were somewhat in excess of those of the preceding week, and specification against existing contracts has been of good volume. Bar makers state that buyers generally are evidently convinced that prices will not be

lower and are placing contracts more freely. There is some talk to the effect that bar prices may be advanced by local mills on third quarter business. It is reported that sales agencies have in several instances of late had small-lot orders for miscellaneous sizes returned to them by operating departments, declined because mills now are evidently inclined to the belief that business has reached a point where they can be a little more discriminating and avoid acceptance of small miscellaneous orders where the material can be obtained from warehouse stocks. The week has shown considerable activity in wire products, in sheets and in structural material. The feeling in Canadian trade circles is that the labor situation is righting itself, and that business in finished products will soon regain normal proportions. The John W. Cowper Co., Buffalo, has received a contract for the Buffalo plant addition for the American Wire Wheel Corporation, requiring a small tonnage of fabricated steel, and the Kellogg Structural Steel Co., Buffalo, has the contract for the Lincoln School building at Syracuse, also requiring a small tonnage.

Prices f.o.b. Buffalo are as follows: Steel bars, 3.40½c.; iron bars, 4.10½c.; shapes, 3.50½c.; plates, 3.70½c.; No. 10 blue annealed sheets, 4.60½c.; No. 28 black, 5.65½c.; No. 28 galvanized sheets, 7.00½c. For "store door delivery" add 0.04½c. to each commodity.

Old Material.—Interest on the part of consumers is increasing, and there is growing inquiry with considerable business being placed. The demand has not yet reached a point, however, where consumers appear willing to accept dealers' views as to prices, particularly as to heavy melting steel and, so far as reported, there have been no large sales of this material recently. Dealers are holding off for \$16.50 to \$17, as they state they expect a \$20 price to prevail before long. Advanced prices have been established for a number of items.

No decision has yet been announced by the Government as to the award on 20,000 tons of forgings, ingots and billets, stored at Buffalo plants, advertised by the ordnance officer at Rochester, bids on which were protested and the material re-advertised.

We quote dealers' asking prices as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel, regular grades.....	\$16.50 to \$17.00
Low phosphorus, 0.04 and under.....	21.00 to 22.00
No. 1 railroad wrought.....	20.00 to 20.50
No. 1 machinery cast.....	22.50 to 23.00
Iron axles	26.00 to 27.00
Steel axles	26.00 to 27.00
Carwheels	21.00 to 22.00
Railroad malleable	19.00 to 20.00
Machine shop turnings.....	8.00 to 9.00
Heavy axle turnings	13.00 to 14.00
Clean cast borings.....	11.50 to 12.50
Iron rails	23.00 to 24.00
Locomotive grate bars.....	19.00 to 20.00
Stove plate	19.00 to 20.00
Wrought pipe	15.00 to 16.00
No. 1 busheling	14.00 to 15.00
Bundled sheet stamping	12.00 to 13.00

St. Louis

ST. LOUIS, June 16.

Pig Iron.—Buying of pig iron for third quarter and for immediate requirements continues, but consumers are not in the market in the usual manner which prevails when a real buying movement is on. The disposition still seems to be to purchase cautiously and some representatives of Southern furnaces have not yet been put in position to compete for business through meeting the differential caused by the freight rate situation which has been referred to previously. Others have sold about all they desire at present prices and are not urging any further sales. The small buying is apparently for current needs, running mostly to carlot and on up to 200 tons, with one inquiry from a stove concern for 2000 tons.

Coke.—There has been a little more activity in coke because of the renewal of a considerable number of rather small contracts for the last half of the year. Very few consumers seem inclined to contract to July 1, 1920, as would be usual at this time. Connellsville

coke is selling at \$5.25 on contract and \$5 for prompt shipment, while New River coke is being held here at \$7.50 and \$7 respectively. Domestic coke contracts are being made to some extent, but the market is not notably active.

Finished Iron and Steel.—In a small way there is steady increase in the call for finished products for at once use, but there is no present disposition to contract ahead or to enter orders for large quantities. In consequence, the warehouses are having rather the best of it, as the buying that is being done is for immediate needs, although the mills are getting a fair proportion of orders on material where the quantity is large enough to make up carlot deliveries. For stock out of warehouse we quote as follows:

Soft steel bars, 3.44c.; iron bars, 3.44c.; structural material, 3.54c.; tank plates, 3.74c.; No. 8 blue annealed sheets, 4.59c.; No. 10 blue annealed sheets, 4.64c.; No. 28 black sheets, cold rolled, one pass, 5.44c.; No. 28 galvanized sheets, black sheet gage, 6.79c.

Old Material.—The scrap market continues to be fictitiously strong, the dealers buying in trades among themselves, but being unable to make any contracts with consumers who are keeping out of the market. Despite the offerings of the railroads listed last week—Mobile & Ohio, 600 tons; Wabash, 1100 tons; Missouri, Kansas & Texas, 1400 tons; Frisco Lines, 800 tons; Union Pacific, 1000 tons; Terminal Railway Association, 1100 tons; Southwestern district roads under Government jurisdiction, 1200 tons—the market continues to hold its own and to advance under the situation noted. But, as already stated, there are no transactions on which to really base the figures given. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails.....	\$22.00 to \$22.50
Old steel rails, rerolling.....	18.50 to 19.00
Old steel rails, less than 3 ft.....	16.50 to 17.00
Relaying rails, standard sections, subject to inspection.....	34.00 to 37.00
Old carwheels.....	20.50 to 21.00
No. 1 railroad heavy melting steel.....	16.00 to 16.50
Heavy shoveling steel.....	13.50 to 14.00
Ordinary shoveling steel.....	13.00 to 13.50
Frogs, switches and guards, cut apart.....	15.50 to 16.00
Ordinary bundled sheets.....	9.00 to 9.50
Heavy axle and tire turnings.....	10.50 to 11.00
Per Net Ton	
Iron angle bars.....	\$16.00 to \$16.50
Steel angle bars.....	13.50 to 14.00
Iron car axles.....	28.00 to 28.50
Steel car axles.....	24.00 to 24.50
Wrought arch bars and transoms.....	20.00 to 20.50
No. 1 railroad wrought.....	16.50 to 17.00
No. 2 railroad wrought.....	15.50 to 16.00
Railroad springs.....	14.00 to 14.50
Steel couplers and knuckles.....	14.50 to 15.00
Locomotive tires, 42 in. and over, smooth inside.....	16.50 to 17.00
No. 1 dealers' forge.....	11.50 to 12.00
Cast iron borings.....	8.50 to 9.00
No. 1 busheling.....	14.00 to 14.50
No. 1 boiler cut to sheets and rings.....	13.00 to 13.50
No. 1 railroad cast.....	21.50 to 22.00
Stove plate and light cast.....	15.50 to 16.00
Railroad malleable.....	13.50 to 14.00
Agricultural malleable.....	13.50 to 14.00
Pipes and flues.....	13.50 to 14.00
Heavy railroad sheet and tank.....	12.00 to 12.50
Railroad grate bars.....	14.00 to 14.50
Machine shop turnings.....	8.00 to 8.50
Country mixed.....	12.50 to 13.00
Uncut railroad mixed.....	14.00 to 14.50
Horseshoes.....	17.00 to 17.50

New York

NEW YORK, June 17.

Pig Iron.—It is estimated that about 35,000 tons of foundry iron was sold last week through New York agencies. The activity has now subsided to a considerable extent, due in part to the conservative attitude of furnaces toward last half delivery. Price cutting at Buffalo is not mentioned as frequently, and one important interest is maintaining a schedule of \$29.75 for No. 1 foundry, \$27 for No. 2 plain and \$28 for No. 2 X. It is probable, however, that iron can still be bought on a basis of \$25.75, Buffalo, for No. 2 plain which, with the freight rate by water of \$2.75 to Sound points, and \$2.35 to New York, makes it difficult for Pennsylvania furnaces to compete with Buffalo in New York and New England territories. Eastern Pennsylvania furnaces are showing less disposition to make concessions as

freely as in the past week or two. Exporters are considerably perturbed on account of the slowness of the cable service, particularly in bringing replies from buyers in foreign countries, and it is strongly intimated that English influences are being exerted to prevent American sales to Sweden and other countries which ordinarily obtain iron from England. Freight rates are declining, especially from Southern ports. It is possible to obtain a rate of \$14 from Southern ports to England and it is probable that \$12 could be done. This makes it possible to ship iron to England and other foreign countries. We quote as follows, delivered New York, for Northern and Southern grades, quotations on the latter being nominal:

No. 1 foundry, silicon, 2.75 to 3.25.....	\$31.55 to \$31.80
No. 2 X, silicon, 2.25 to 2.75.....	29.80 to 30.80
No. 2 plain, silicon, 1.75 to 2.25.....	28.55 to 29.80
No. 2 X, Virginia, silicon, 2.25 to 2.75.....	31.40 to 31.90
No. 1 Southern, silicon, 2.75 to 3.25.....	32.45
No. 2 Southern, soft (all rail), sil., 2.25 to 2.75.....	30.70
No. 2 Southern (all rail), sil., 1.75 to 2.25.....	29.45

Ferroalloys.—The demand for domestic ferromanganese is stronger and prices are firmer. It is believed that resale metal has entirely disappeared. If any is still available it is held at a minimum of \$115 to \$120 per ton. Domestic producers are holding firm to their quotations of \$125, delivered, as against the British price of \$121, seaboard. There are more inquiries in the market than in many weeks, the total being about 1000 tons for various deliveries. One tentative inquiry appeared for 500 to 1000 tons, but it has been withdrawn. Most of the electric alloy made by a large copper company has been sold, some of the 78 per cent alloy going at less than \$125. The spiegeleisen market is quiet, with very few inquiries reported. Sales of about 500 tons were made in the last week, most of which is understood to have gone at about \$30, furnace. We quote the market at \$27 to \$30, furnace, depending upon the analysis and the delivery. There is very little news regarding manganese ore except that the price of Indian ore has stiffened to 70c. per unit, seaboard. Ferrosilicon, 50 per cent, is obtainable at \$75 to \$80 per ton, delivered, and the 15 per cent electric product is \$55. The market is very quiet.

Finished Iron and Steel.—A reduction of \$3 a ton in ocean freight rates to the United Kingdom by leading steamship companies makes the British market more accessible to American mills, which in some instances are able to quote c.i.f. prices equal to or lower than those which British steel makers are reported by cable to be quoting for home consumption. The new rate on steel products to the United Kingdom from New York is \$17 per ton; on pig iron and scrap, \$16, and on tinplate and non-ferrous metals, \$18. Among some of the larger exporters, however, there is a disposition not to force sales of American steel in Great Britain; in other words, not to take undue advantage of the needs of that country, but to follow a course which will help rather than hinder the British steel industry in overcoming the many difficulties it is reported to be encountering. In this connection there is further talk, though nothing authoritative, of an international agreement on steel export trade and prices which will protect the interests of England, France and Belgium from harmful competition of the more favorably situated American steel industry. Export trade is better than a month ago, though orders are mostly for moderate-sized tonnages. Japan and South American countries are the principal buyers, the Japanese being quite active, many inquiries emanating from that country's representatives. A sale of 1000 tons of heavy rails to Italy by an export company was somewhat surprising, in view of the fact that the c.i.f. quotation was \$85, and there being also an unfavorable exchange rate. Building construction in New York and vicinity is showing some progress. Two apartment buildings to be built by Paterno Brothers, one on Seventy-first Street and one on 102d Street, New York, have been contracted for, the steel totalling 1250 tons, to be fabricated by the Hedden Iron Construction Co. The Bethlehem Steel Bridge Corporation has taken 350 tons for a factory at Amsterdam, N. Y., for McCleary, Wallin & Crouse. The American Bridge Co. has been awarded the contract for an elevated station

at Lawrence Street, Brooklyn, requiring 300 tons. A factory building at Gardner, Mass., for the Heywood Brothers & Wakefield Co. has been let to the Eastern Bridge & Structural Co. The Axelrod apartment building in New York, taking 600 tons, has been awarded to the Belmont Iron Works. An office building for the Chicago Pneumatic Tool Co., East Forty-fourth Street, New York, is up for bids, and a building for the Federal Sugar Refining Co., Yonkers, N. Y., about 700 tons, is also in the market. Bids have been put in for an 1800-ton bridge for the Boston & Maine Railroad at Haverhill, Mass. Bids will close on June 25 for several Navy Department projects for which specific appropriations have been made, under the terms of which contracts must be let before July 1. These jobs include 1300 tons for a structural shop at the Boston Navy Yard; 1800 tons for a storage building at the League Island Navy Yard, Philadelphia; 2500 tons for crane runways at the Brooklyn Navy Yard; 350 tons for two 400-ft. wireless towers at San Francisco. Bids will be closed June 18 for 600 tons for 12 marine barracks at Quantico, Va. These are the last Navy buildings to be constructed until Congress authorizes new appropriations. Domestic steel business in this market shows only a slight improvement. The plate market is particularly dull, and it is stated that on a fairly large tonnage 2.50c. to 2.55c., Pittsburgh, undoubtedly could be done, though nearly all mills are quoting 2.65c. on the small inquiries now current. We quote mill shipments as follows: Bar iron, refined grade, 2.62c.; double refined bar iron, 3.62c.; soft steel bars, 2.62c.; shapes, 2.72c.; plates, 2.92c.; all New York.

Warehouse Business.—June business shows an appreciable improvement over May, with the sheet trade leading in increased activity and beginning to show in a number of cases a disposition to undertake a settlement of second-half requirements. A good miscellaneous trade is resulting from plant repair work, which is being more generally undertaken than for some time past. Mild steel bars are now sought for this purpose; and some good tonnage has been placed for reinforcing, although nothing like normal. Structural business is holding well. Cold-rolled shafting is in demand at net list. One factor quoting 10 to 12 off f.o.b. Hartford, Conn., presumably to compete with Pittsburgh, has not served so far to reduce this price. Free-cutting screw stock is now required in fair quantity for making set and machine screws. One of the leading factors has revised recent lists to give \$1.50 off per 100 lb. on nuts instead of \$1.25, on washers \$2 instead of \$1.50, and has added plus extras for less-than-keg lots. We quote No. 10 blue annealed sheets, 4.57c.; No. 28 black sheets, 5.37c.; No. 28 galvanized sheets, 6.50c.; steel bars, 3.37c.; structural shapes, 3.47c.; plates, 3.67c.; bands 3/16 in. No. 10 and 12, 4.07c.

High-Speed Steel.—The overstocked condition of most users of this material makes limited buying through the summer a practical certainty. Sellers report orders confined to their well-established trade, whose wants are generally extremely small. The order placed recently by the Pennsylvania Railroad with the Vanadium Alloys Steel Co. for about \$50,000 of high-speed drills for its shops is the last sizable order of this kind reported. There have been a number of other inquiries from the railroads, but they are believed in most cases to be for feeling out the market. Evidence grows that Sheffield tool steel continues to be offered at \$1.35 per lb. delivered in this country. We quote the average price of \$1.60 per lb., although some grades are obtainable at lower figures.

Cast-Iron Pipe.—Bids on 1200 tons for the city of Boston were received last Thursday, and R. D. Wood & Co., Philadelphia, were the low bidders, while on 850 tons for Dartmouth, Mass., the Warren Foundry & Machine Co. was low. Contracts have not yet been awarded. There is a very fair inquiry from private buyers. We quote New York prices as follows: 6-in. and heavier, \$52.70; 4-in. \$55.70; 3-in., \$62.70, and \$1 additional for class A and gas pipe.

Old Material.—The market has experienced an average raise of 75 cents within the last seven days,

which is attributed to more inquiries, more sales, and a more confident feeling for the future on the part of dealers thus leading them to stock their yards and wait for higher prices. The greatest volume of sales centers around heavy melting steel, borings and turnings, and iron pipe. There is a tendency to quote prices higher than actual sales justify. New York dealers consider significant the action of a certain Pittsburgh consumer who bought 9000 tons of steel scrap at \$18.50, delivered, then refused to buy more for a price greater than \$17.50, suddenly realizing the large amount of scrap to be had and believing he could secure enough at the lower figure. An order for 3000 tons of steel scrap for China was recently filled. Brokers' and dealers' buying prices, New York, follow:

Heavy melting steel	\$12.50 to \$13.00
Rerolling rails	16.50 to 17.00
Relaying rails, nominal	40.00 to 41.00
Steel car axles	21.00 to 22.00
Iron car axles	27.00 to 28.00
No. 1 railroad wrought	19.50 to 20.00
Wrought iron track	14.00 to 14.50
Forge fire	9.00 to 10.00
No. 1 yard wrought, long	17.00 to 18.00
Light iron	7.00 to 8.00
Cast borings (clean)	9.50 to 10.00
Machine shop turnings	9.00 to 9.50
Mixed borings and turnings	7.50 to 8.00
Iron and steel pipe (1 in. minimum diameter) not under 2 ft. long	14.00 to 14.50
Stove plate	15.50 to 16.00
Locomotive grate bars	15.50 to 16.00
Malleable cast (railroad)	14.00 to 14.50
Old carwheels	20.00 to 20.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	\$21.50 to \$22.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	20.50 to 21.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast radiators, cast boilers, etc.	16.50 to 17.00

Cincinnati

CINCINNATI, June 17.

Pig Iron.—Both northern and southern iron is showing some strength. Although the inquiry for foundry iron to be shipped during the last half is still encouraging, sales have not been as large in either size or number as they were two weeks ago. The Standard Sanitary Mfg. Co. has put out another inquiry for four thousand tons of foundry iron, August and September shipment, to its Louisville plant. It is also asking for a round lot of iron for its Pittsburgh plant for third quarter shipment. Some Southern producers are still equalizing freight rates, but this action is not universal in that district. Southern Ohio furnaces are also willing to absorb differences where they do not average over \$1 a ton, but are charging the full schedule at non-competitive points. Hot weather has cut down the production of iron to some extent, but this is offset by the smaller melt due to the same cause. No further inquiries for basic have been received, but it is known that at least one melter in this district will have to come into the market for sufficient iron to last through the last quarter of the year. High silicon irons are still in good demand and the schedule, so far as Ohio producers are concerned, is being maintained.

Based on freight rates of \$3.60 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, silicon, 1.75 to 2.25 (base price)	\$28.10 to \$28.60
Southern coke, silicon, 2.25 to 2.75 (No. 2 soft)	29.60
Southern gray forge	28.35
Ohio silvery, 8 per cent silicon	42.05
Southern Ohio coke, silicon, 1.75 to 2.25 (No. 2)	28.55
Basic, Northern	27.55
Standard Southern carwheel	51.60

Finished Material.—At the annual convention of the National Association of Sheet Metal Contractors, Columbus, Ohio, last week it was brought out that contractors in Ohio were buying more galvanized sheets than at any time in the past twelve months. Reports as to prices being shaded last month in some districts had some foundation, but the mills now seem to be holding firm at the regular market price of 5.70c., Pitts-

burgh, on No. 28 galvanized sheets. Local jobbers are selling nails at \$3.75 per keg base, and while it is rumored they intend to advance the quotation to the old figure of \$3.85, no definite information can be obtained as to when the proposed advance will take place. A much better demand for structural material that includes concrete reinforcing bars has developed in the past few days and all jobbing houses are more optimistic regarding the future.

The following are present local jobbers' prices: Steel and iron bars, 3.33c. base; bands, 4.03c. base; structural shapes, 3.43c. base; plates, $\frac{3}{4}$ -in. and heavier, 3.63c. base; No. 10 blue annealed sheets, 4.53c., and wire nails, \$3.75 per keg base.

Coke.—Foundry coke is being bought for last half shipment by consumers who had not provided for their full year's requirements. Transactions in furnace coke are limited. It is generally reported that the ovens are unwilling to sell much coke for shipment after December 31, and all of them seem to believe that prices will be higher at an early date. Connellsville quotations have been advanced within the past 30 days 25c. to 50c. per ton. Furnace coke in that field is quoted at \$4 to \$4.25 at oven and foundry from \$5.50 to \$5.75. Wise County and Pocahontas grades remain around \$6 to \$6.50.

Old Material.—Scrap dealers feel optimistic as to the future and prices on some grades have been marked up 50c. to \$1.50 per ton. The largest advance is on rerolling steel rails, the buying price of which ranges from \$17 to \$18 per gross ton at dealers' yards. Cast borings are also firmer, but the previous quotation of \$6 to \$6.50 per net ton is unchanged.

Per Gross Ton

Bundled sheet	\$10.00 to \$10.50
Old iron rails	22.50 to 23.00
Relaying rails, 50 lb. and up	40.00 to 41.00
Rerolling steel rails	17.00 to 18.00
Heavy melting steel	14.00 to 14.50
Steel rails for melting	14.00 to 14.50
Old carwheels	17.50 to 18.00
No. 1 railroad wrought	15.00 to 16.00

Per Net Ton

Cast borings	\$6.00 to \$6.50
Steel turnings	5.50 to 6.00
Railroad cast	17.00 to 18.00
No. 1 machinery	17.50 to 18.00
Burnt scrap	11.50 to 12.00
Iron axles	23.00 to 23.50
Locomotive tires (smooth inside)	14.00 to 14.50
Pipes and flues	12.00 to 12.50
Malleable cast	12.00 to 12.50
Railroad tank and sheet	9.00 to 9.50

Cleveland

CLEVELAND, June 17.

Iron Ore.—Activity has fallen off in the past few days. Ore firms are continuing to urge consumers not to delay buying, warning them that they may have trouble getting shipments late in the season, and that they may have to pay higher vessel rates when the grain movement gets well under way. Some Eastern consumers seem to feel that ore prices may sag off and are apparently delaying purchases on that account. This feeling of uncertainty may have been aroused by the offer recently of some off-grade ore in the Eastern market at a price concession. It is stated that this ore was not put on the market by a regular seller, but by a consumer who had more than he needed, and it is not believed that its offering at a cut price will affect the market, as generally the price situation is very firm. Ore shipments by merchant firms have increased considerably during the past few days, although cargoes are not available for all the ore carrying boats. Ore prices delivered f.o.b., lower Lake ports, as follows:

Old range Bessemer, \$6.45; old range non-Bessemer, \$5.70; Mesaba Bessemer, \$6.20; Mesaba non-Bessemer, \$5.55.

Coke.—The market is stronger and a little more active. Quite a few consumers are placing contracts for the last half, and several of the leading makers are adhering to \$5.25 for standard makes of foundry coke for that delivery. One interest advanced its price 25c. to \$5.25 during the week. Some Wise County coke is being sold under contract for a period of 6 to 12 months at \$7.50 at oven.

Pig Iron.—The buying movement is gaining momentum, and some sellers report that the number of orders booked during the week broke all previous records, although the tonnage sold has been exceeded in previous buying movements when steel-making iron was active. Inquiries are still coming out in large volume. The Michigan automobile industry was a large buyer of iron during the week, round lots being purchased by the Ford Motor Co., General Motors Corporation and its allied foundries, and other foundries engaged in automobile work. About two-thirds of the iron sold was of foundry grade, and the remainder largely malleable. Silvery iron has become active, and dealers representing southern Ohio furnaces made sales aggregating 4,000 tons for the last half. Two Cleveland selling interests report sales of 130,000 tons of pig iron in the first two weeks of June, one having sold 48,000 tons last week. Individual sales range from small lots up to 8,000 tons. While sales were largely for the last half, some contracts for both foundry and malleable cover requirements through the first three or four months of 1920. Some separate inquiries for iron for the first half of next year have come out, but sellers do not seem disposed to take orders for shipment beyond Jan. 1, except in cases where they are booking iron for this year's delivery at the same time. A West Virginia consumer has closed for 3,500 tons of basic iron for June and July shipment, but with this exception no activity is noted in steel-making iron. Southern Ohio furnaces have advanced the price of Ohio silvery iron, 7 per cent silicon, 50c. a ton, or to \$38.25. The spread between this iron and 8 per cent silicon iron has been \$2.50 and sellers found that with this difference in price some consumers who ordinarily wanted 8 per cent iron, were purchasing the 7 per cent grade. We quote delivered Cleveland, as follows:

Bessemer	\$29.35
Basic	27.15
Northern No. 2 foundry, silicon, 1.75 to 2.25	27.15
Southern foundry, silicon, 2.25 to 2.75	28.40
Gray forge	26.15
Ohio silvery, silicon, 8 per cent	42.65
Standard low phos., Valley furnace	\$40.00 to 42.00

Finished Iron and Steel.—The demand for finished steel has become more active and is fairly heavy, and orders for semi-finished steel have improved. Many of the makers of automobiles and automobile parts are contracting for their requirements in both carbon and alloy steel for the third quarter and last half, and there is a good volume of current orders for small lots of steel. Screw stock consumers are buying freely and round tonnages in bar orders are coming from the bolt and nut manufacturers. Plates are still rather dull, and there are some reports of price shading. However, boiler shops are buying freely, and many are paying the \$2 a ton premium price quoted by an Eastern mill. In structural work the Burger Iron Co., Akron, has taken 1000 tons for a plant addition for the Goodyear Tire & Rubber Co., the King Bridge Co., 900 tons for grade crossing elimination bridges in Cleveland, and the Toledo Bridge & Crane Co., 200 tons for a building for the Moline Plow Co., Moline, Ill. The Dravo Construction Co., Pittsburgh, has placed 500 tons of sheet steel piling with the Lackawanna Steel Co. for Government dam work in the Ohio River, and the Government will take bids shortly for the Emsworth Dam, near Pittsburgh, that will require 1500 tons in piling and other steel. Inquiries have come out for 1000 tons of light rails. Reinforcing bars are in heavy demand and prices are somewhat firmer. While the regular price of 2.25c., Pittsburgh, has been shaded as much as \$3 a ton recently, one mill has now advanced its price to 2.35c. for less than car lots. The demand for sheets is rather light except for finished sheets for automobiles, but on these some of the mills are several weeks behind in shipments. Sheet prices are still irregular, this being particularly true of galvanized sheets which have been shaded as much as \$5 per ton. A round tonnage of Government sheets was sold in this territory during the week, going largely to jobbers. Warehouse prices are as follows:

Steel bars, 3.27c.; plates, 3.57c.; structural shapes, 3.37c.; bands and hoops, 3.97c.; No. 10 blue annealed sheets, 4.47c.; No. 28 black sheets, 5.27c.; No. 28 galvanized sheets, 6.62c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved, and is now fairly active. Quite a few consumers are placing contracts for the third quarter at regular prices. Local rivet makers who recently opened their books for third quarter contracts have decided to take contracts for the entire last half, and many consumers are placing contracts for that delivery at regular prices.

Cast Iron Pipe.—Cleveland has placed an order with the United States Cast Iron Pipe & Foundry Co. for 600 tons of cast iron pipe at \$50.75 delivered to the city's yards, the seller making that quotation for all sizes called for, which were up to 24 in.

Old Material.—The market has become more active, and heavy melting steel has continued its advance, being from 50c. to \$1 a ton higher than a week ago. Practically all other grades have also advanced. Some round-lot sales of heavy melting steel were made several days ago at \$17.50 and \$18, but during the past few days sales have been made at \$18.50 to Valley and to Cleveland mills, one local consumer taking 1500 tons at that price. Yard dealers have large stocks, which they are holding for further advances, and the amount of scrap that is available at present prices appears to be quite limited, this being especially true of heavy melting steel. Dealers are paying \$18.50 for small lots of this grade to cover short sales. We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel.....	\$18.00 to \$19.00
Steel rails, under 3 ft.....	20.00 to 21.00
Steel rails, rerolling.....	19.00 to 20.00
Iron rails.....	24.00 to 25.00
Iron car axles.....	30.00 to 31.00
Steel car axles.....	28.50 to 29.50
Low phosphorus melting scrap.....	21.00 to 22.00
Cast borings.....	11.75 to 12.00
Iron and steel turnings and drillings.....	10.50 to 11.00
Compressed steel.....	16.25 to 16.75
No. 1 railroad wrought.....	20.00 to 21.00
Cast iron carwheels.....	23.00 to 24.00
Agricultural malleable.....	16.50 to 17.50
Railroad malleable.....	18.50
Steel axle turnings.....	15.00 to 15.50
Light bundled sheet scrap.....	14.50 to 15.00
No. 1 cast.....	23.00 to 24.00
No. 1 busheling.....	17.00 to 17.50
Drop forge flashings, 10 in. and under.....	16.00 to 16.50
Drop forge flashings, over 10 in.....	15.00 to 15.50
Railroad grate bars.....	18.50 to 19.00
Stove plate.....	18.50 to 19.00

Dominion Steel Corporation Earnings

In his statement to the shareholders of the Dominion Steel Corporation, Sydney, N. S., for the fiscal year ended March 31 last, President Mark Workman reports that "during the period which has elapsed since April 1, 1915, the total expenditure upon construction and for the acquisition of new properties was approximately \$11,500,000, and as the whole of this amount was provided from earnings, the directors have thought it well to set apart an equivalent portion of the surplus of the corporation as a general reserve. For this purpose \$8,500,000 has been transferred from profit and loss account together with \$3,000,000 for special reserve brought forward from last year. Earnings of the company for the past year equaled 17 per cent on the common stock, against 23.7 per cent for the year ending 1918. Profits of the company after deducting all operating expenses, repairs, maintenance and business profits tax, amounted to \$8,768,054, as compared with \$11,030,112 in the previous year. After deducting bond interest and the regular preferred dividends there was left available for dividends on the common stock \$5,470,468, against \$7,601,660 the previous year and \$8,221,165 in the 1916-17 period. After deducting the common dividends, there remained a balance for carrying forward the sum of \$3,705,904, bringing the total at credit of profit and loss up to \$17,459,251.

Holders of both common and preferred stock of the United States Steel Corporation decreased in number during the three months ended May 29. At the first of this period, there were 78,018 holders of common stock and 80,120 preferred, which figures decreased during the quarter to 74,071 and 79,115, respectively. Interpreted, this shows that the public generally buys steel at the bottom and sells at the top.

IRON AND INDUSTRIAL STOCKS

High Call Money Produces a Decided Reaction—Trading Still Heavy

NEW YORK, June 17.

Considerable of a halt in the long-drawn-out series of million-share days was effected in the last week—not so far as the actual total shares dealt in is concerned, which still exceed a million each full day, but in the upward trend and the wildness of the buying. The cause has been the high rates for money, which exceeded any record since 1912 late last week. For call money as high as 12 per cent was demanded. The result was a reaction of decided proportions which caused most stocks to drop from 15 to 2 or 3 points, the decline running into the Monday session this week. Steel common fell to nearly 103 and other steel and copper shares in proportion. To-day, with an easing in the money situation, stocks rallied from 2 to 10 points, steel common recovering to 106.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com. 39 - 45	Int. Har. pf. 119½-120
Allis-Chalm. pf. 95 - 96	Lackaw. Steel. 77 - 85½
Am. Can. com. 50½-57½	Lake Sup. Corp. 19½-20½
Am. Can. pf. 103 -107½	Lima Loco. 52½-53
Am. Car & F. cm. 101 -107½	Midvale Steel. 48 - 51½
Am. Car & F. pf. 116½-117	Nat.-Acme. 35½-37½
Am. Loco. com. 80 - 83½	Nat. E. & St. cm. 70½-81½
Am. Loco. pf. 107 -107½	Nat. E. & St. pf. 102 -102½
Am. Ship pf. 90 - 90	N. Y. Air Brake. 115 -120½
Am. Steel Fdries. 36½-42	Nova Scotia Stl. 76 - 90
Bald. Loco. com. 93½-102½	Pressed Stl. com. 79 - 84½
Bald. Loco. pf. 109 -109	Ry. St. Spg. com. 87 - 92½
Beth. Steel com. 88½-91	Ry. St. Spg. pf. 108½-108½
Beth. Stl. Cl. B. 82½-93	Republic com. 84½-90½
Case, J. I. pf. 100 -100½	Republic pf. 102½-104½
Cent. Fdry. com. 20½-26	Sloss com. 60½-65½
Cent. Fdry. pf. 46 - 52	Superior Steel. 45½-50½
Chic. Pneu. Tool. 74 - 74	Sup. Steel 1st pf. 103
Colo. Fuel. 44½-50	Transue-Williams 56 - 57½
Cru. Steel com. 86 - 94½	Un. Alloy Steel. 50 - 52½
Cru. Steel pf. 99½-103	U. S. Pipe com. 29½-34½
Deere & Co. pf. 99½-103	U. S. Pipe pf. 62½-64½
Gen. Electric. 160 -163½	U. S. Steel com. 103½-109
Gt. N. Ore Cert. 45½-47½	U. S. Steel pf. 116½-116½
Gulf States Steel 56½-67½	Va. I. C. & Coke 66 - 66
Harb.-W. Ref. cm. 112 - 112	Westing. Elec. 54½-57½
Int. Har. com. 137½-146½	

Dividends

The American Brake Shoe & Foundry Co., quarterly, 1½ per cent on the common and 3 per cent on the preferred, payable June 30.

The Canadian Car & Foundry Co., quarterly, 1½ per cent on the preferred, payable July 10.

The Canadian Locomotive Co., quarterly, 1½ per cent on the common and 1½ per cent on the preferred, payable July 1.

The Empire Steel & Iron Co., 3 per cent, payable July 1.

The Ingersoll-Rand Co., 3 per cent, payable July 1.

The International Harvester Co., quarterly, 1½ per cent on the common, payable July 15.

The Otis Elevator Co., quarterly, 1½ per cent on the common and 1½ per cent on the preferred, payable July 15.

The United Shoe Machinery Co., quarterly, 50c. and extra \$1 on the common and 37½c. on the preferred, payable July 5.

The Westinghouse Air Brake Co., quarterly, \$1.75, payable July 31.

The Wheeling Steel & Iron Co., quarterly, 2 per cent, payable July 1.

Industrial Finances

Earl Conder, Indianapolis, has been appointed ancillary receiver of the Simples Tool & Machine Co. of Cleveland by the Federal Court at Indianapolis.

The National Enameling & Stamping Co. will sell 7 per cent cumulative preferred stock, authorized but unissued and amounting to \$1,453,400, to its stockholders. With the proceeds the company will buy \$1,250,000 worth of stock of the St. Louis Coke & Chemical Co., which is building a new blast furnace at Granite City, Ill., as described in THE IRON AGE of March 27, 1919.

Negotiations in connection with the proposed purchase of the National Steel Car Co., Hamilton, Ont., by the American Car Co. have been broken off, according to Sir John Gibson, president of the Hamilton company.

Negotiations have been carried on for some time past between Baldwins, Ltd., the Imperial Munitions Board and the Harbor Commissioners relative to the

purchase of the plant of the British Forgings at Toronto. Baldwins, Ltd., will establish a large tin plate mill in Toronto if the negotiations come to a satisfactory conclusion and would use the electric furnace equipment of the British Forgings' plant in the making of steel ingots for tin plate.

The sale of stock has started for the new steel company promoted by Edward F. Clarke, president of the Liberty Steel Co., Warren, Ohio, and associates to be built at Newton Falls, Trumbull county, Ohio. A site has been acquired on which a 12-mill unit for the production of high-grade sheets will be constructed. The Liberty Steel Co. has been purchased by the Trumbull Steel Co. which will take possession July 1. The new company is capitalized at \$3,000,000; divided \$2,000,000 common and \$1,000,000 preferred. One million common will be issued and \$500,000 preferred at this time.

Stockholders of the Mahoning Foundry Co., Youngstown, Ohio, have authorized an increase in the capital stock from \$65,000 to \$150,000, for plant extensions. The company operates two plants.

At a recent meeting of the stockholders of the Central Steel Co., Massillon, Ohio, an increase in the preferred capital stock from \$5,000,000 to \$7,500,000 was authorized. The additional capital will be used in making plant extensions.

The Standard Screw Co. had net profits after taxes and depreciation of \$1,187,613 for 1918, or \$126,176 less than for the nine months ended Dec. 31, 1917. This equaled \$45.52 a share on common stock.

The Hoosier Rolling Mill Co., Terre Haute, Ind., has issued \$2,000,000 of 10-year 8 per cent gold bonds, the proceeds of which are to be used in enlarging its plant for the manufacture of steel bars, structural iron and reinforced bars for concrete work. J. R. Finkelstein is president of the company.

Steel Ingot Output Curtailed

The country's steel ingot production in May averaged about 85,024 gross tons a day or at the rate of 26,272,000 tons annually, as compared with 102,514 tons daily, or an annual rate of 31,677,000 tons, for April of this year and 136,859 tons daily, or an annual rate of 42,289,000 tons, for May, 1918. These figures are based on reports to the American Iron and Steel Institute from 29 companies which made 85.10 per cent of the total production in 1917 and from 30 companies making 84.03 per cent in 1918, and assume 27 working days in May and 309 days for the year. On the basis of the above percentage of the 1918 output, the May production for the country would be 2,295,637 tons as compared with 3,695,215 tons in May, 1918, or nearly 38 per cent less.

The table below gives the tonnage of steel ingots produced in 1918 by 29 companies making in that year about 85.10 per cent of the entire amount, and for the past five months figures from 30 companies making 84.03 per cent of the production in 1918.

Monthly Production of Steel Ingots—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1918 ..	1,763,356	429,588	16,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381
April	2,377,974	769,249	16,187	3,163,410
May	2,475,131	796,244	15,858	3,287,233
June	2,281,718	786,380	15,348	3,083,446
July	2,311,545	784,997	17,093	3,113,635
August	2,299,177	766,869	17,643	3,083,689
September	2,407,993	772,863	16,802	3,197,658
October	2,527,776	807,043	17,377	3,352,196
November	2,291,720	753,409	15,631	3,060,760
December	2,273,189	706,844	12,273	2,992,306
Total, 1918 ..	27,145,860	8,591,189	185,242	35,922,291
January, 1919 ..	2,351,153	749,346	7,279	3,107,778
February	2,043,635	655,206	5,842	2,704,683
March	2,109,528	555,332	6,405	2,662,265
April	1,732,447	560,770	6,494	2,299,711
May	1,506,915	414,392	8,617	1,929,924
5 mos.	9,733,778	2,875,046	34,637	12,643,461

BIG ATTENDANCE AT DETROIT

Aims and Organization Proposals and Professional Sessions Share Interest

DETROIT, June 17.—With nearly 1000 registered before the close of the second day, the spring meeting of the American Society of Mechanical Engineers, at Detroit, is notable not only for the numbers present but for the sustained interest in the professional sessions. New proposals covering aims and organization were discussed in a prolonged afternoon gathering yesterday, were considered again this morning, and the subjects are to be taken up again to-morrow morning.

A morning session to-day on research was continued through the afternoon, and the counter attractions, including unusual opportunity for plant visitation, did not prevent a large attendance at a session given over to industrial relations.

Among the important recommendations affecting the professional activities of the society were the following:

That the society may approve and adopt professional reports and standards; heretofore they have merely been received and printed.

That industrial engineering be considered a major subject.

That the joint engineering employment bureaus be expanded and made more efficient.

That a committee of five be appointed to draw up a new code of ethics, which, like one to be prepared by the civil engineers, shall be short, broad in scope and general in character with positive, rather than negative injunctions, and one to be enforced vigorously.

A proposal that the society journal be made a weekly was not approved by the meeting, but the publication of something in the way of a handbook of mechanical engineering data, though definiteness was lacking, met the favor of the majority. The debates were spirited at times, particularly on a proposal which, as finally carried, provides for creating an agency composed of representatives of local and state groups and national societies to act and to speak in the name of the profession.

Molders' Strikes Failing

Strikes of molders in foundries in central New York, New England and the Middle West are becoming weaker as men are put in their places and as striking workmen return. In Syracuse the five striking shops are now in operation and in one of these, the Globe Malleable Iron & Steel Co., a temporary injunction has been issued to prevent the exerting of outside influences, such as picketing, upon the workmen. In Baldwinsville, nearby, one shop is out on strike. In Auburn all shops are operating, though suffering from outside interference. An injunction has been issued in the case of the Willsea Works in Rochester; three other shops in that city are in operation. In Utica two shops are resuming activity after a strike close-down.

Molding operations are running smoothly in Worcester, Mass., after considerable labor trouble. The strikes in Detroit are practically over and the full complement of workers engaged. The same conditions hold in Minneapolis and St. Paul.

British Plans for Trade Extension

WASHINGTON, June 18—(By Wire).—Information from Switzerland reports that John Brown & Co., Sheffield, England, have decided to establish a central depot for raw steel products in the free bonded area of Geneva to supply Swiss needs. The depot will be on a large scale, with a scientific laboratory in which the cantonal authorities have promised participation. Former Commercial Attaché Skipworth of the British Legation at Berne is to be the manager. Washington authorities look upon this as another evidence of British plans to secure hold on continental steel trade.

OFFICE CHANGES

The Thomas D. Prosser Co., for 15 years located in the Schmulbach Building, Wheeling, West Va., has opened a new office at Wooster, Ohio. It will be the main office, with branches at Wheeling, Pittsburgh and Philadelphia. The officers are T. D. Prosser, president, L. V. Rockwell, vice president and Ira M. Smith, secretary. Mr. Smith, who has just returned from France, will be resident manager at Wheeling. The lines handled include the heavier iron and steel commodities, such as pig iron, billets, rails, bars, structural shapes, plates, scrap, mill cinder and roll scale, fluorspar, coke, coal, etc.

The Wm. B. Scaife & Sons Co., Pittsburgh, will open on July 1 a Chicago sales and engineering office at 38 South Dearborn Street with Charles F. O'Hagan, formerly chief engineer of the company at Pittsburgh, as resident engineer and manager. This company is one of the oldest manufacturing concerns west of the Allegheny mountains. It manufactures steel tanks for air, gas and liquids, steel shipping drums, range boilers, steel structures, water softeners and filtering equipment.

The Central Steel Co., Massillon, Ohio, has opened new offices in Detroit, in the Book Building, 35-57 Washington Boulevard. Arthur Schaeffer, former assistant director of sales at the home office, Massillon, Ohio, has been appointed district manager of sales, with Frank Gibbons as his assistant. Mr. Gibbons, who has just joined the organization, has been associated with the Carbon Steel Co. for five or six years. For the last several months, he has been district sales manager of its Detroit office.

F. H. Niles & Co., Inc., New York, has opened a branch office at Room 508 Security Building, 1115 Main Street, Bridgeport, Conn., in charge of F. H. Andrus, formerly with the Winchester Repeating Arms Co., New Haven, and recently salvage expert in the Bridgeport district ordnance office. Through this new office, Mr. Andrus will attend to the regular company lines of machine tools and foundry equipment, and, in addition, will buy and sell new and old metals, iron and steel scrap.

The Continental Iron & Steel Co., New York, iron and steel scrap, has established a branch office in the Consumers' Company Building, State Street, Chicago, in charge of Joseph E. Jacobson of Cincinnati. The company contemplates opening other branches in Pittsburgh and elsewhere.

The Standard Parts Co., Cleveland, has opened a branch sales office for its Standard Welding division in New York City at 1006 Times Building. William A. Paxton, formerly connected with the Chicago office of the company, is in charge.

The Newhall Chain Forge & Iron Co., New York, has opened a branch office at 126 North 10th Street, Philadelphia, in charge of L. M. Post, formerly the southern representative of the company.

The Federal Tool & Alloy Steel Corporation announces the removal of its general and executive offices to the seventeenth floor of the Woolworth Building, New York.

The office of the Niles-Bement-Pond Co. in Pittsburgh has been moved from the Frick Building to 425 Seventh Avenue. A stock of Pratt & Whitney small tools will be kept at this new office and store.

A branch of the Wheeling Steel & Iron Co., Wheeling, W. Va., has been opened in the Rialto Building, San Francisco, under the management of N. J. Higinbotham.

The Steel Tank & Pipe Co. of California, San Fran-

cisco, has opened offices in the Hanford Building, San Francisco, where it is announced that the company's factory in Berkeley will be ready to make deliveries early in June. C. H. Ramsden, for nine years chief engineer of the Western Pipe & Steel Co., San Francisco, is president of the new company.

The Diamond Expansion Bolt Co., 90 West Street, New York, has opened a Philadelphia office at 126 North Tenth Street, where a complete stock will be carried. L. M. Post has been appointed Philadelphia manager.

The James Ohlen & Sons Saw Mfg. Co., Columbus, Ohio, has opened a sales office in Cleveland.

The Evans Valve & Piping Co. has opened offices at 617 Chamber of Commerce Building, Chicago, and will promote the sale of piping and accessories, valves, sluice gates, hydrants, cast-iron pipe, etc.

The Niles-Bement-Pond Co., New York, has opened a new office and store at 116 South Avenue, Rochester, N. Y. A stock of Pratt & Whitney machinist's small tools will be kept at the store.

H. F. Watkins & Co., San Francisco, have opened an office in the Hanford Building, where they will represent a number of ice-making machinery houses.

SHORT TRADE ITEMS

Arthur G. McKee & Co., Cleveland, have taken an order from the Pittsburgh Crucible Steel Co. for a Kling-Weidlein gas cleaner, which will be installed for cleaning the gas from two furnaces. The same firm has also taken a contract from the Marting Iron & Steel Co. for a second 20 x 100-ft. stove.

The Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., has established an office at 24 Stone Street, New York, for the purpose of handling export business. L. S. Devos, recently returned from overseas duty with the A. E. F., has been placed in charge.

The Chase Motor Truck Co., Syracuse, N. Y., has sold that part of its business devoted to the manufacture of farm tractors and parts to a large Canadian organization, which will operate under the style, Chase Tractor Co., with temporary quarters at 376 West Water Street, Syracuse, N. Y.

The Champion Crane & Engineering Co., Kenton, Ohio, has taken a contract for standard cranes for the new steel plant of the Weirton Steel Co., Weirton, W. Va. The cranes will be about 15 in number, from 5 to 15 tons in capacity. The order for the cranes for the open-hearth plant was recently placed with the Morgan Engineering Co.

After being closed for almost six months, two 14-in. and 16-in. rolling mills of the Steelton plant of the Bethlehem Steel Corporation resumed operations on Monday of this week. These mills will be operated on a single 8-hr. shift. Several new contracts made necessary the reopening of these mills.

The New Jersey Zinc Co., New York, has just established warehouses in San Francisco and Los Angeles from which its products will hereafter be distributed to its trade on the Pacific Coast.

The S. Severance Mfg. Co., Glassport, Pa., has made arrangements with W. H. Farrell, 501 Fifth Avenue, New York, for the sale of its rivets in New York and the New England States.

The J. Lipsitz Co., Chelsea, Mass., has established a fully equipped scrap iron yard of approximately eight acres, in Lebanon, Pa. on P. & R. tracks.

The Alliance Steel Casting Co., Alliance, Ohio, is planning erection of a steel castings plant. W. H. Purcell is president.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

The prices below are based on those announced at Washington by the Industrial Board on March 20, 1919, effective the following day, which since that date have largely governed market transactions, though there have been variations, as indicated in market reports on other pages.

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload 40,000 lb.; and \$1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs:

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zeels, structural sizes, 2.45c.

Wire Products

Wire nails, \$3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50, and shorter than 1 in., \$2.00. Bright basic wire, \$3.15 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.00; galvanized wire, \$3.70; galvanized barbed wire and fence staples, \$4.10; painted barbed wire, \$3.40; polished fence staples, \$3.40; cement-coated nails, \$2.85 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ per cent off list for carload lots, 59½ per cent for 1000-rod lots, and 58½ per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets, \$3.70 base
Large boiler rivets, \$3.80
¼ in., 5/16 in. and 7/16 in. diam., 65-10 and 5 per cent off list
Machine bolts, h.p. nuts, ¾ in. x 4 in.:
Smaller and shorter, rolled threads, .60-10-5 per cent off list
Cut threads, .60-5 per cent off list
Larger and longer sizes, .50-10 per cent off list
Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:
Smaller and shorter, .45-10-10 per cent off list
Larger and longer, .40-10-5 per cent off list
Carriage bolts, ¾ x 6 in.:
Smaller and shorter, rolled threads, .60-5 per cent off list
Cut threads, .50-10-5 per cent off list
Larger and longer sizes, .45-10 per cent off list
Lag bolts, .65-5 per cent off list
Flot bolts, Nos. 1, 2, 3, .60 per cent off list
Hot pressed nuts, sq. blank, 3.25c. per lb. off list
Hot pressed nuts, hex., blank, 3.25c. per lb. off list
Hot pressed nuts, sq. tapped, .3c. per lb. off list
Hot pressed nuts, hex., tapped, .3c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank, 3.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped, .3c. per lb. off list
Semi-finished hex. nuts:
¾ in. and larger, .70-10 per cent off list
9/16 in. and smaller, .80 per cent off list
Stove bolts, in packages, .75-10-10-5 per cent off list
Stove bolts, in bulk, .2½ per cent extra
Tire bolts, .60-10-10-5 per cent off list
The above discounts are from March 28, 1919.
All prices carry standard extras. Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52; chain rods, \$60; screw, rivet and bolt rods and other rods of that character, \$60. Prices on high carbon rods are irregular. They range from \$65 to \$75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, and small spikes, per 100 lb., \$3.35 in lots of 200 kegs of 200 lb. each or more; track bolts, \$4.35 per 100 lb. in carload lots of 200 kegs or more, and \$4.90 in small lots. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Prices on bar iron are 2.35c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

Steel				Iron			
Inches	Black	Galv.		Inches	Black	Galv.	
1/8, 1/4 and 3/8	50½	24		1/8 and 1/4	29½	21	
1/2	54½	40		3/8	30½	34	
3/4 to 3	57½	44		1/2	34½	16½	
				3/4 to 1½	39	23½	
Butt Weld				Lap Weld			
1/8	50½	38		1/8	24½	9½	
1/2 to 6	53½	41		1/2	31½	17½	
7 to 12	56½	37		2	32½	18½	
13 and 14	41			2½ to 6	34½	21½	
15	38½			7 to 12	31½	18½	
Butt Weld, extra strong, plain ends				Lap Weld, extra strong, plain ends			
1/8, 1/4 and 3/8	46½	29		1/8	25½	10½	
1/2	51½	39		1/2	31½	17½	
3/4 to 1½	55½	43		2	33½	20½	
2 to 3	56½	44		2½ to 4	35½	23½	
				4½ to 6	34½	22½	
				7 to 8	26½	14½	
				9 to 12	21½	9½	

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3½ to 4½ in. 40½	3½ to 4½ in. —16
2½ to 3½ in. 30½	3 to 3½ in. —1½
2½ in. 24	2½ to 2¾ in. +1
1¾ to 2 in. 19½	2 to 2½ in. +10
	1¾ to 1¾ in. +20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in. \$327	1¾ in. \$207
1¼ in. 267	2 to 2½ in. 177
1¾ in. 257	2¾ to 3¾ in. 167
1½ in. 207	4 in. 187
	4½ to 5 in. 207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed—Bessemer

No.	Cents per lb.
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75

Box Annealed, One Pass Cold Rolled—Bessemer

No.	Cents per lb.
Nos. 17 to 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55

Galvanized, Black Sheet Gage—Bessemer

No.	Cents per lb.
Nos. 10 and 11	4.70
Nos. 12 and 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20

Tin-Mill Black Plate—Bessemer

No.	Cents per lb.
Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.45
Nos. 30½ and 31	4.45

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery						
Copper, New York			Lead		Spelter	
Lake	Electro-lytic	Tin, New York	New York	St. Louis	New York	St. Louis
11.00	17.75	17.50	72.50	5.40	5.15	6.75
12.00	17.87½	17.62½	72.50	5.40	5.15	6.97½
13.00	18.00	17.75	72.50	5.40	5.15	6.97½
14.00	18.00	17.75	72.50	5.40	5.15	6.95
16.00	18.00	17.75	72.50	5.35	5.10	6.90
17.00	18.25	18.00	72.50	5.35	5.10	6.85

NEW YORK, June 17.

Metals are all moderately active, with prices generally steady. Copper is again stronger, with sales at advancing prices. The tin market continues extremely quiet but prospects for open trading are brighter. Demand for lead is light but prices have been advanced after a short period of buying. Spelter has had a bulge in activity and prices, but is again quiet and slightly lower. Antimony is quiet but firm.

New York

Copper.—The buying movement referred to last week subsided toward the end of the week, leaving prices at a slightly higher level. To-day a revival of demand is reported and prices have stiffened until electrolytic copper is quoted at 18c. for June-July delivery, with Lake at about 18.25c., both New York. For August and later delivery from ¼c. to ½c. above these levels is asked, but producers are disinclined to commit themselves for future shipment unless obliged to do so. Most of the buying early this week has been for domestic account, but it is freely stated now that in the movement a week ago Japan was a decidedly important participant. There has also been some other export buying reported. Operations are at close to a 60 per cent basis and sales of a number of companies lately have been equal to their current output.

Tin.—Two important announcements affecting the tin trade have appeared in the last week. The weekly statement of George Armsby, chief in charge of tin, appeared yesterday and shows a balance of 577 gross tons of the allocated tin unsold on June 16. It also states that all restrictions on the sale of pig tin in the United States will be removed as soon as the rest of the allocated tin has been disposed of. A definite announcement of the removal of these restrictions will be made in due course. The other important news item is to the effect that shipments of tin from points of origin will be permissible after June 30, 1919, and that import licenses for such shipment will not be valid for entry until Aug. 1. It is inferred from these statements that a free market in tin will be in effect within the next two or three weeks within the confines of the United States and also that shipments from the Straits and from England will commence in July, valid for entrance into the United States after Aug. 1. It is the expectation therefore that early in August an absolutely free tin market will prevail throughout the world unless some unforeseen events prevent it. There is very little interest in the market at present. There have been some sales of July shipment from the East at \$52.25, but consumers are generally abstaining from the market. In the last six to eight weeks there has been considerable buying of tin for shipment when restrictions are removed and it is believed that the total amounts to from 4000 to 5000 tons, mostly Straits. We continue to quote Straits at the fixed price of 72.50c., New York, with but little metal available under this level.

Lead.—The leading interest advanced its price from 5.25c., New York, to 5.40c., New York, on June 11 and the outside market quickly responded. A fair business was done during the last week, but demand has quieted since then until now outside lots are offered just under the price of the leading interest, or at 5.35c., New York, and 5.10c., St. Louis, which we quote as the

market. There is but little activity, but the tone is strong and steady.

Spelter.—The last week has seen a much better demand and a decided advance in prices, with a slight recession since the height of the movement was reached. As a result of some foreign demand, in which Japan was a participant, as well as considerable buying by dealers from producers, the market rose about the middle of last week to 6.62½c., St. Louis, or 6.97½c., New York, for prime Western for early delivery. It is stated that spelter was sold as high as 6.65c., St. Louis, and that more could have been sold at this level. Within the last few days demand has slackened and prices have eased until to-day prime Western for early delivery is quoted at 6.50c., St. Louis, or 6.85c., New York. There is quite a little export inquiry as well as an interest by consumers for far future delivery, but producers are disinclined to take advantage of the latter.

Antimony.—Wholesale lots for early delivery are quoted unchanged at 8.37½c. to 8.50c., New York, duty paid, for Asiatic grades.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted at 33c., New York.

Old Metals.—The market is firm. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	17.50
Copper, heavy and wire	16.50
Copper, light and bottoms	14.25
Brass, heavy	11.50
Brass, light	8.50
Heavy machine composition	16.50
No. 1 yellow rod brass turnings	9.50
No. 1 red brass or composition turnings	13.75
Lead, heavy	5.00
Lead, tea	4.25
Zinc	5.00

St. Louis

ST. LOUIS, June 16.—The non-ferrous markets have been quiet the past week with the quotations on carlots as follows: Lead, 5.15c.; spelter, 6.70c. In less than carlots the quotations were: Lead, 5.40c. to 5.50c.; spelter, 7.25c.; tin, 72.50c.; copper, 17.75c. to 18c.; Asiatic antimony, 9.50c. In the Joplin district a firmer feeling existed in ores with the result that the range was generally \$1 higher and the second grades were stiffer than they have been for some time. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 7c.; heavy yellow brass, 9c.; light copper, 11c.; heavy red brass, 13.50c.; heavy copper and copper wire, 13.50c.; pewter, 35c.; tinfoil, 44c.; lead, 4c.; zinc, 3.5c.; tea lead, 3c.

Chicago

CHICAGO, June, 16.—Continued activity in copper has resulted in another advance. The tin situation is unchanged; it is reported that price restrictions will be removed August 1. Lead has advanced again in sympathy with copper. Spelter is stronger. Considerable business has been booked for June, July and beyond. Little antimony is moving but prices are holding firm. Most grades of old copper and brass have advanced again. We quote copper at 18c. to 18.25c. for carloads; tin, 72.50c.; lead, 5.15c. to 5.25c.; spelter, 6.75c.; antimony, 9.50c. to 10c. On old metals we quote copper wire, crucible shapes, 14.50c.; copper clips, 14c.; copper bottoms, 12.50c.; red brass, 14.50c.; yellow brass, 9c.; lead pipe, 4c.; zinc, 4c.; pewter, No. 1, 35c.; tinfoil, 37c., and block tin, 50c., all these being buying prices for less than carload lots.

D. Tyne O'Day & Sons, Rio de Janeiro, Brazil, announce the opening of their offices at 149 Broadway, New York, under the management of Herbert S. Davis. The company is prepared to receive and give prompt attention to inquiries on the following Brazilian products: Manganese ore, ferromanganese, pyrolusite, zirconium, monozite, etc. Having its own salesmen and buyers covering all Brazil, the company is prepared to furnish a market for American manufactured products.

PRESENT COSTS OF RAIL MILLS

Federal Trade Commission Asks New Statements for Use of Railroad Administration

WASHINGTON, June 17.—The fact that the Federal Trade Commission is endeavoring to secure a new statement of rail production costs from the various steel companies for the Railroad Administration does not presage a resumption of rail purchases by the latter. "We are just keeping ourselves informed" said one of the Railroad Administration officials. The fact that the Railroad Administration, as the largest customer of the rail mills, can use the Federal Trade Commission is of considerable interest to the industry and has caused some comment. The Federal Trade Commission, however, declares that there is nothing new in the proceeding and that it had already furnished practically the same figures to the Peek Industrial Board of the Department of Commerce. The figures, however, are not to be made public by the Federal Trade Commission or the Railroad Administration.

Lake Erie Iron Co. Taken Over

A new company headed by Norris J. Clarke, vice-president and secretary Upson Nut Co., Cleveland, has acquired the rolling mill and bolt and nut works of the



NORRIS J. CLARKE.

Lake Erie Iron Co., Cleveland, under a 5-year lease, with an option of purchasing, and will take possession of the plant July 1. The new company will be known as the Lake Erie Bolt & Nut Co., and will have a capital stock of \$2,500,000 in preferred stock, \$1,500,000 of which will be issued, and 250,000 shares of common stock, no par value, of which 150,000 shares will be issued. Mr. Clarke will be president of the company and H. E. Volmer, at present auditor of the Upson Nut Co., will be secretary and treasurer.

The Lake Erie Iron Co. is one of the oldest bolt and nut works in the Central West, having been organized in 1852, and having operated as an incorporated company since 1876. F. R. Scofield is president and C. W. Scofield secretary and treasurer. Its plant includes an 18-in. muck bar mill, and three finishing mills, which were added to the bolt and nut works in 1900.

Mr. Clarke, who will be at the head of the new company, is prominently identified with the iron and steel industry of the Central West, and his rise in that industry has been rapid. After leaving the Cleveland high school, he became an office boy for the Bourne-Fuller Co., Cleveland, in 1896, working up to salesman in 1903, and manager of the company's Pittsburgh office in 1905. In 1912 he was elected secretary and director of the Upson Nut Co., and became vice-president of that company in December, 1918. During the war, he served for several months with the rank of major in the Ordnance Department, Artillery Ammunition Metal Components Division.

The new company will have no affiliation with the Upson Nut Co., which Mr. Clarke is leaving.

Wooden Cars Increased Fatalities

The chief of the Bureau of Safety, Washington, has issued a report in pamphlet form of an investigation of an accident which occurred on the Philadelphia & Reading railroad near Fort Washington, Pa., Jan. 13, 1919, in which 14 were killed and 22 were injured in a rear-end collision. Photographs and charts describe the lay-out of the track and the topography of

the land. The concluding paragraph states: "As had been pointed out in the foregoing, all the cars in train 381 were of wooden construction, and the rear car was telescoped approximately three-quarters of its length, being practically destroyed. Had steel cars been used in this train the number of fatalities and injuries would undoubtedly have been materially reduced."

Large Coal Holdings of J. V. Thompson Sold for \$18,000,000

UNIONTOWN, PA., June 17.—In the name of the Piedmont Coal Co., a Pennsylvania corporation, a combination of large financial interests have bought the immense coal holdings of J. V. Thompson in western Pennsylvania and West Virginia for a consideration approximating \$18,000,000. Negotiations for the sale which is probably the largest single coal deal on record were completed June 14 at Pittsburgh, following extended conferences between the trustees in bankruptcy and attorneys of the purchasing interests. The sale is contingent upon the approval of the United States District court not later than Dec. 31. The actual identity of the purchasers has not been disclosed.

Samuel McClay of Pittsburgh is president of the Piedmont Coal Co. and William T. Irwin of Pittsburgh is treasurer. Mr. McClay is an attorney and Mr. Irwin is treasurer of the Union Trust Co.

Unsecured creditors will receive \$5,500,000 in cash by the terms of the sale or about 43c. on the dollar. Unsecured claims total \$13,000,000. The deal involves not only the real estate but Mr. Thompson's personal property and leaves him nothing of what for years was the largest block of virgin coal holdings owned by any individual in the world. An appraisal of the Thompson estate was taken on June 8, 1915, being made by Julian Kennedy and R. C. Crawford of Pittsburgh and R. M. Hite of Fairmont. The appraisal showed an estimated value of the property to be \$65,367,758.05. It was divided as follows:

Greene County holdings—
Acreage, 58,403.79 valued at \$32,647,900.50.
Washington County holdings—
Acreage, 10,172.29 valued at \$8,150,186.60.
West Virginia holdings—
Acreage, 72,103.03 valued at \$18,868,841.55.
Fayette County holdings—
Acreage, 735 of coal, 7,877.49 of surface valued at \$2,646,500.
Stocks, bonds, mortgages and notes, \$6,099,619.40.

Prior to the sale just closed, the trustees had made sales aggregating about \$6,500,000, making the entire selling price of the vast estate around \$25,000,000 less than half of its appraised value. Mr. Thompson was discharged from bankruptcy as an individual on Feb. 14, of this year. His discharge, however, had no effect upon the estate which remained in the hands of the trustees. Since that time Mr. Thompson has conducted a number of deals at a considerable profit and his friends declare that he is again started on the road to financial success after having lost a fortune of \$65,000,000.

Training Skilled Workers

WASHINGTON, June 17.—Charles T. Clayton, director of the United States Training Service, Department of Labor, is trying to interest all American manufacturers in the importance of training skilled workers. Of the 9,871 different occupations in industry, Mr. Clayton points out that there are apprenticeship systems in less than 60 lines. Even in many of these, the apprenticeship consists merely of instruction or shop training during a certain length of time. The training service is now engaged in working out definite training systems for workers engaged in nine important industries and also in a plan to increase the efficiency of foremen.

In accordance with a decision of the Federal Court, Charleston, W. Va., the property of the Becker Steel Co., with local plant, taken over by the Alien Property Custodian during the war period, has been restored to the treasurer of the company. The court has decided that the action of the custodian was in error.

DISPOSING OF SURPLUS

Director Hare Tells About Salaries and Methods —Discussed in Congress

WASHINGTON, June 17.—The War Department organization for disposition of surplus property was the subject of an extended debate when the Army appropriation bill came before the House of Representatives last week. An effort was made to reduce the million dollars asked for by Secretary Baker to \$300,000, but the House voted down the amendment.

In the hearings which preceded the debate, C. W. Hare, Director of Sales, outlined the organization of his office. One of the chief complaints made on the floor was leveled at the fact that the organization included a salary list of approximately \$250,000 a year. Compared with some industrial salaries, the items in Mr. Hare's payroll would seem small. On the basis of Government salaries, however, they were large. The payroll showed that Mr. Hare himself received \$25,000 a year; E. C. Morse, first assistant director of sales, \$10,000 a year; and a second and third assistant received \$8,000 a year each. Although the payroll mentioned only a second and third assistant, Mr. Hare testified that besides Mr. Morse and second and third assistants, his assistant directors of sales include Col. F. Glover, Lt.-Col. Guy Hutchinson and Lt.-Col. A. LaMar; nine chiefs of sections were listed at \$6,000 each; 32 assistant chiefs at \$3,600 a year; and 45 secretaries, stenographers and clerks at salaries ranging from \$1,200 to \$2,000 a year.

Mr. Hare explained that this organization had to co-ordinate the numerous surplus lines left in the hands of the Army. He said:

When the Assistant Secretary of War asked me to take charge as director of sales for the disposal of surplus property, I found a rough estimate had been made—and I say rough because it is practically impossible to get an absolute accurate inventory of the materials—I found that there was an estimated total of \$1,931,500,000 worth of stuff, divided among the various branches of the Army, which under the law we were required to sell at the best possible price. The Comptroller of the Treasury and the Judge Advocate General of the Army decided when the question was raised, as it was raised almost immediately, as to whether we could give the things away or sell them for a nominal sum, that we could not. I therefore tried at once to build up an organization that would succeed in putting back into the Treasury the maximum possible for the Government, and in the last few months we have made sales of a total of \$252,385,000—that is, we have recovered \$252,385,000 on material that cost the Government but \$291,000,000. That covered material of every sort and description.

Roughly speaking, we have still a declared surplus of \$1,695,000,000 to dispose of.

The organization that I set up to carry that on consisted of the men who were specialists in the various commodities which we had for sale. I tried in building up the organization to get the very best possible men available who were specialists in those particular lines.

We have vast quantities of metals. We had vast quantities of machine tools, some \$75,000,000 worth of those. So I set up an organization.

My work in private life is as sales manager for the United Gas Improvement Co., with which I have been connected for 20 years. During the war they gave me a leave of absence which enabled me to do a variety of things, and recently they have made the necessary arrangements to allow me to continue here, if I am needed.

Mr. Hare also detailed at length the special work of the machine-tool section. He told the committee that he had received an offer from Belgium by cable for \$12,000,000 worth of machine tools, as well as an offer from the Roumanian Government. He did not make public, however, the details of these offers. In telling of the work done by the raw materials and scrap section, Mr. Hare put into the record an outline of the sales methods by which he declared large sums of money had been saved to the Government.

The War Department also announced that the Engineer Department of the American Expeditionary Forces in France have requested authority to return to the United States approximately 225 tons of tool steel because of the poor market in France. An an-

nouncement also is made that machine tools used in aircraft production valued at \$11,000,000 are ready for sale, a portion to be disposed of in Europe.

Orders have been sent to the American Expeditionary Forces to return to this country all class B trucks, all new dump truck bodies, and all Dodge and Cadillac automobiles that are boxed or crated.

Since Nov. 11 settlement has been made of all but 11 of 1200 contracts placed in Europe by the Quartermaster Department of the A. E. F. The value of the canceled portion of these contracts was approximately \$37,000,000. The cost of the cancellation was about \$75,000, or 0.2 per cent, says a statement issued by the War Department.

Will Try to Organize Steel Workers

A campaign for thoroughly organizing the workers in the steel industry, long under contemplation, was launched in earnest at a conference at Atlantic City, June 16, of 24 presidents of international labor unions and Samuel Gompers, president of the American Federation of Labor. Concentration of effort will be placed in the Pittsburgh district where a fight will be made for "right of free assemblage, free speech and a free press." John Fitzpatrick of Chicago, who directed the organization of workers in the packing industry, was chosen chairman of the committee in charge of the work.

Mr. Gompers warned the union leaders that the "iron and steel men are powerful and have wealth beyond the ken of men," and that the contest was likely to be sharp.

"Already we have obtained the 8-hr. day in the steel industry, but let me tell you that was not handed to us on a silver platter," he said. "I may say, also, that you needn't really fear going to jail. I was sentenced twice to jail, and the judge wanted me to go. But I did not go, and the man who sentenced me is no longer a judge. There is no power in the United States that can prevent this campaign, and so long as we are on the right road I am willing to go the limit with you. We will bring about the emancipation of the steel workers."

Sheet Metal Contractors Meet

The National Association of Sheet Metal Contractors held its annual convention in Columbus, Ohio, June 10 to 13. The Ohio Sheet Metal Contractors, an allied organization, held their annual meeting and election, June 12. The following officers were elected for the ensuing year: President, John Weigel, Cincinnati; vice-president, A. E. Munkel, Columbus; treasurer, W. J. Birmingham, Cleveland, and secretary, W. J. Kaiser, Columbus.

New officers of the National Association are: President, Arthur P. Lamneck, Columbus; vice-presidents, F. P. Higgins, St. Louis, Mo.; John Pierpont, Washington, D. C.; J. B. Kelly, Newark, and George P. Werner, St. Louis, Mo. Edwin A. Seabrooke, Philadelphia, was re-elected secretary, and Julius Gerock, of St. Louis, Mo., was selected as treasurer.

The next annual convention of the National Association will be held in Peoria, Ill., and the Ohio Association will meet in Toledo.

Scrap Advances

YOUNGSTOWN, OHIO, June 17.—Tightening of the market in various grades of iron and steel scrap indicates a brisker demand. In the past two weeks crops have advanced from \$17.50 to \$22.50 a ton. Sheet scrap baled sold two weeks ago for \$10.50 a ton and one dealer is now asking \$14.50.

The Kauffman Metal Parts Co., Bellefontaine, Ohio, has purchased the Charles Humphrey foundry building, and adjoining real estate in that city, and in addition to occupying that building will erect a new building 150 x 80 ft.

Machinery Markets and News of the Works

TOOL TRADE MORE ACTIVE

Two Good-sized Lists Issued at Chicago

General Motors Corporation Places a Large Machinery Order with Ohio Company

One of the largest machinery orders placed since the signing of the armistice has been awarded to the Defiance Machine Works, Defiance, Ohio, by the General Motors Corporation, and includes multiple drilling and other types of automobile manufacturing tools largely of a special character. It is understood that the order totals about \$1,500,000.

Business continues active in the Central West, particularly at Chicago, Detroit and Cleveland. Two fair-sized lists have been issued in Chicago, one by the Chicago Pneumatic Tool Co. for about 40 tools for its new plant at Franklin, Pa., and the other by the Worthington Pump & Machinery Corporation, covering about 35 tools for its Cudahy, Wis., plant. The Collins Rotary Safety Razor Co., which is building a \$100,000 plant in Chicago, bought 17 automatic screw machines, 10 punch presses, tool-room equipment, buffing machines, hardening furnaces, riveting machines, and other equipment. The Haynes Automobile Co., Kokomo, Ind.,

has also entered the Chicago market as a purchaser of tools required for an addition to its plant.

A Cleveland builder of turret lathes and screw machines has just taken a round-lot order for shipment to France and Belgium.

Increased activity in machine tools is also noted at Milwaukee, Cincinnati and in New England. In New York, the past week has been rather quiet. A few inquiries are before the trade, one for 8 or 10 tools from the Long Island Railroad. The Fellows Gear Shaper Co., Springfield, Vt., has made important purchases of tools.

Second-hand tools are being purchased by many Eastern manufacturers, and this is lessening the movement of new ones. The latest offering is about \$1,000,000 worth of machines from plants of the Savage Arms Corporation by a New York machinery dealer. The Philadelphia District Salvage Board on June 18 took bids on about 300 used tools from the plant of the Eddystone Munitions Co., Eddystone, Pa.

The Ordnance Department is removing machine tools and other equipment from ordnance plants at Baltimore to various Government arsenals.

The Bureau of Supplies and Accounts, Navy Department, has asked for bids by Sept. 24 on 24 48-in. turning lathes; 16 48-in. boring and turning lathes and six boring machines for the Washington naval ordnance plant.

New York

NEW YORK, June 17.

Taking pre-war sales records as a basis, some machine-tool houses are doing business at a fairly satisfactory rate, but conditions are somewhat spotty, a number of sellers complaining that the competition of second-hand tools is causing them to lose orders. On the other hand, most machine-tool builders are anxious to facilitate the absorption of second-hand tools, and a few are co-operating to the extent of buying tools of their own make, shipping them to their plants for reconstruction and later resale with their own guarantee as to condition and serviceability. Most of the second-hand tools on the market are of the small and medium sizes. Second-hand machinery dealers say there is a scarcity of large machines, particularly of lathes over 48 in., planers over 36 in. and 5 and 6 ft. radial drills; also large boring mills. An offering of second-hand tools valued at about \$1,000,000 has been made by the Savage Arms Corporation from its Utica, N. Y., and Philadelphia plants.

A few inquiries are before the trade for small lots of machines. The Long Island Railroad has inquired for about 8 or 10 tools—turret lathes, drills, etc.; the Cambria Steel Co., through its Philadelphia purchasing office, has asked for quotations on three boring mills, a slotter, a planer and other large tools for its Johnstown, Pa., plant, and the Standard Oil Co. of New Jersey, which has recently placed large orders, is still in the market for equipment, including a plate-bending roll. This company last week placed an order for 13 punches and shears. The Norfolk Navy Yard has placed an order totaling about \$59,000 with a Philadelphia dealer for turret lathes, drills, etc. The Redington Standard Fittings Co., Redington, Pa., the new manufacturing enterprise of the Bethlehem Steel Co. and Bethlehem Shipbuilding Corporation, will buy a few new tools, but will use mostly equipment to be taken from some of its machine shops used on war work. Fraser, Brace & Co., 1328 Broadway, New York, are in the market for plate-working machines and machine tools for a new ship repair plant and dry dock to be built in co-operation with the Emergency Fleet Corporation.

The Champion Engineering Co., Kenton, Ohio, in one week booked orders for 17 cranes. Ten of these will go to the Weirton Steel Co., Weirton, W. Va., for additions to its plant, there being four 10-ton, three 15-ton, one 25-ton, one 30-ton and one 45-ton capacity. The Singer Sewing Machine Co. will buy cranes for its new foundry to be built at Elizabeth, N. J. Inquiries for cranes from the Bethlehem

Steel Co., Bethlehem, Pa., and Westinghouse Church Kerr & Co., New York, for the new plant of the Chicago Pneumatic Tool Co. at Franklin, Pa., are pending.

The New York Edison Co., Irving Place and Fifteenth Street, New York, is having plans prepared for a new electric and transformer plant at 421-23 East Sixth Street, three stories, 45 x 75 ft., estimated to cost equipped \$60,000.

The Madison Tire Rubber Corporation, New York, has been incorporated with an active capital of \$625,000 by B. H. Macquhae, C. W. Smith and H. L. Kimberly, 30 East Forty-second Street, to manufacture tires and rubber goods.

The Fitzpatrick Products Corporation, New York, has been incorporated with an active capital of \$28,750 by F. Y. Forbes, W. DeF. Ireland and C. M. Gilpin, 99 John Street, to manufacture machinery, implements and tools.

The Lovelace Tractor Co., New York, has been incorporated with a capital of \$100,000 by J. C. Hochman, R. W. Conaro and T. T. Lovelace, 43 West Thirty-second Street, New York, to manufacture tractors and parts.

Fire, June 11, destroyed the two-story machine shop of the James Hart Co., West New Brighton, N. Y., including a section of the coppersmith shop, located at Richmond Terrace and North Bergen Avenue. The fire spread to the plant of the McWilliams Dry Dock & Machine Co., adjoining, damaging and partially destroying four buildings at this works. The total loss is estimated in excess of \$100,000.

The Government has released the space occupied in the Bush Terminal Buildings, Brooklyn, for the past 17 months, and plans are under way for using the property for private manufacturing interests.

The Brooklyn Rapid Transit Co., 85 Clinton Street, Brooklyn, has made application to the Federal Court for permission to purchase the power house at Kent and Division avenues, Williamsburg, owned by the Brooklyn City Railroad Co., for about \$225,000. It is proposed to utilize the property for the rapid transit lines.

The Navy Department, Washington, is arranging for an appropriation of about \$6,000,000 for the reconstruction and improvement of drydock No. 3 at the Brooklyn, N. Y., navy yard, to include construction and repair facilities for ship work.

The R. & P. Auto Enameling Co., New York, has leased the two-story building, 80 x 100 ft., now being constructed at 329-35 West Fortieth Street, for a new works.

The Pathé Freres Phonograph Co., 18 Grand Avenue,

Brooklyn, has filed plans for a seven-story addition to its phonograph manufacturing plant, 90 x 110 ft., for increased output. The extension is estimated to cost \$175,000.

The Union Tank Line Co., 21 East Fortieth Street, New York, has increased its capital stock from \$12,000,000 to \$25,000,000, changing the company name to the Union Tank Car Co.

The Eastern Fibre Board Co., Clifton, N. J., has been incorporated with a capital of \$50,000 by Frederick M. Butler, Benjamin I. Ward and Harry N. Davidson, to manufacture fibre board, etc.

The Ford Motor Co., Detroit, Mich., has awarded contract to the Turner Construction Co., 244 Madison Avenue, New York, for the completion of its plant on Newark Bay, Kearny, N. J., for automobile assembling work.

Franklin Williams, Inc., 10 Railroad Place, Newark, N. J., manufacturer of brass castings, etc., has filed plans for a one and two-story foundry at Oliver and Jefferson streets, 48 x 151 ft., to cost \$20,500.

The Craig Boulton Mfg. Co., Newark, N. J., has been incorporated with a capital stock of \$100,000 by M. D. Boulton, New York; L. A. Newton and R. C. Carson, Newark, to manufacture metal products.

Fire, June 1, destroyed a portion of the pressing department at the plant of the Celluloid Co., Westcott Street, Newark, N. J., with loss estimated at \$15,000.

The Cutlery Corporation of America, Newark, N. J., has been incorporated with a capital stock of \$100,000 by Otto E. Quitman, William Crossant and Harry S. Creamer, Newark, and Edgar J. Schutt, Covington, N. J., to manufacture cutlery, surgical instruments, etc.

The Jacobs Bed Spring Co., Newark, N. J., has been incorporated with a capital stock of \$50,000 by Louis, David and Jacob Jacobs, to manufacture bed springs and other wire and metal products.

The Orchard Garage & Supply Co., Newark, N. J., will build a machine shop and service works at 23-25 Camp Street, to cost about \$12,000. A. A. Lance, 52 Ficherior Street, heads the company.

The Bollinger-Peck Co., 22 Pennington Street, Newark, N. J., has filed notice of organization to manufacture crank pin turners and other products. Frederick P. Bollinger and Wilfred J. Peck head the company.

The Essex Auto Electric Service, Inc., Newark, N. J., has been incorporated with a capital of \$100,000 by Gottlieb Jacobs and Philip Lowits, to manufacture electrical appliances.

The Gnone Mfg. Co., Elizabeth, N. J., has been incorporated with a capital of \$60,000 by Frederick A. Hemphill, Augustus F. and Albert F. Bender, to manufacture mechanical and other toys.

The Weston Wheel Corporation, New York, has been incorporated with a capital stock of \$250,000 by W. S. Sawyer, C. F. Bailey and F. G. Fischer, 900 Riverside Drive, to manufacture automobile wheels.

The I. X. L. Machine & Tool Co., 197 Grand Street, New York, has filed notice of dissolution.

The Practical Garage Co., New York, has commenced the erection of a one-story machine shop and service works on property recently acquired on West 144th Street, near Lenox Avenue.

H. W. Schrimpf & Co., Perth Amboy, N. J., operating an iron works at Lewis and Second streets, have been incorporated with a capital stock of \$125,000 by H. W. Schrimpf, Herbert Schrimpf and Levin A. Moore.

The Albany Auto Co., Albany, N. Y., has been incorporated with a capital stock of \$30,000 by H. J. Goldberg, 330 Madison Avenue; G. N. Knapp, 11 High Street, Albany, and S. H. Law, 628 Seventy-fifth Street, Brooklyn, N. Y., to manufacture parts for automobiles.

Pember & Campaigne, architects, 24 James Street, Albany, are taking bids for a machine shop, 52 x 68 ft., one story, to be erected at Thatcher and Leonard streets, that city, by George H. Thatcher at an estimated cost of \$16,000.

The Thatcher Propeller & Foundry Corporation, Albany, with a capitalization of \$1,200,000, has been incorporated by G. H. and T. C. Thatcher and H. S. Bell.

McClary, Wallin & Crouse, Amsterdam, N. Y., have awarded contract for erection of a one and two-story addition to their factory to the J. W. Bishop Co., 107 Foster Street, Worcester, Mass.

Catalogs Wanted

Hermann Raffel, exporter and importer, with headquarters at Copenhagen, Denmark, has established a New York office in the Tribune Building, in charge of S. H. Nyholm, during the war technical adviser to the Danish Legation at Washington, detailed to handle purchases in this country for the Danish Government. Catalogs, price lists, etc., are desired from manufacturers and others.

Philadelphia

PHILADELPHIA, June 16.

D. H. McGookin, 1630 North Ninth Street, Philadelphia, manufacturer of iron and steel forgings, bolts, etc., is planning a one-story forge shop addition, 90 x 90 ft.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids for the construction of a new assembly shop at the aircraft works, League Island Navy Yard, Philadelphia. The structure with equipment is estimated to cost in excess of \$500,000. A pattern shop to cost about \$300,000 will also be constructed.

The Wright Roller Bearing Co., Twenty-ninth Street and Indiana Avenue, Philadelphia, has arranged for an immediate stock issue of \$500,000 for general expansion. The company is now constructing an addition to its works to more than double the present output of automobile bearings, and it is planned to occupy the structure at the earliest possible date. The company recently increased its capital from \$1,000,000 to \$2,000,000.

The Philadelphia & Reading Railroad has curtailed operations at its locomotive shops at Reading, Pa., now giving employment to 2500 men.

The Lycoming Foundry & Machine Co., Williamsport, Pa., manufacturer of gas and gasoline engines, etc., has increased its capital from \$480,000 to \$700,000.

Active construction work has been inaugurated on the one-story addition to the plant of the Chicago Pneumatic Tool Co., Franklin, Pa., 50 x 150 ft., to be equipped as an assembling works at an estimated cost of \$50,000.

The boiler plant of the Sugar Run Coal Co., Dysart, Pa., was destroyed by fire June 8. The plant was used for works operation and will be rebuilt, it is understood, at an early date.

The Juruick Engineering Corporation, Allentown, Pa., has increased its capital from \$10,000 to \$75,000.

Application has been made by R. V. Alexander, Lancaster, Pa., for the incorporation of the Keystone Oven Co., to operate a works at Harrisburg for the manufacture of bakers' ovens and kindred equipment.

John L. Evans and S. B. Costenbader, Slatington, Pa., are organizing a company to establish and operate a local plant for the manufacture of caskets. The new organization will have a capital of \$75,000. A site for the works is now being selected.

With reduction of new engine work at its Juniata shops, Altoona, Pa., the Pennsylvania Railroad is planning to devote a large part of operations to locomotive repair work this summer. The company is assigning cars from foreign railroads to its Harrisburg shops for repair at the present time.

The Norton Mfg. Co., Camden, N. J., has been incorporated with a capital of \$25,000 by M. H. and Samuel Norton and L. D. Morgan, to manufacture machinery and machine parts.

The John E. Thropp's Sons Co., Trenton, N. J., manufacturer of tire-making machinery, has completed plans for a two-story machine shop, 63 x 320 ft., on Low Street, to cost about \$75,000, including machinery.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, has awarded contract to H. C. Dahl, 231 South Eighth Street, for its proposed two-story foundry at Hatboro, Pa., estimated to cost \$40,000.

The Lawfer Automobile Co., Allentown, Pa., will increase the capacity of its machine shop and repair department by an addition, 60 x 60 ft.

The York Hardware & Brass Co., York, Pa., capitalized at \$25,000, has been chartered to manufacture brass and other castings. The incorporators are J. Elmer, E. D. and R. F. Workman, York, and George S. MacIntosh, Philadelphia.

The Lower Merion Motor Co., Ardmore, Pa., which plans to conduct a machine shop, has been incorporated with a capital stock of \$20,000 by George H. Evans and George A. Burk, Drexel Hill, Pa.; D. Peale Polk, 35 East Lancaster Avenue, Ardmore.

Announcement has been made of the sale of the Lehigh Valley Structural Steel Iron Co., Allentown, Pa., to Robert Kift, Bethlehem, Pa., formerly connected with the Bethlehem Construction Co. The Allentown Chamber of Commerce issued the announcement and added that New York and Reading capital had been interested. Fabricated steel will be produced.

The United States Cast Iron Pipe & Foundry Co., Burlington, N. J., is having plans prepared for a two-story brick and steel machine shop at its Addyston, Ohio, works, to cost, with equipment, about \$150,000.

Buffalo

BUFFALO, June 16.

The J. P. Devine Co., manufacturer of vacuum drying and impregnating machinery, Buffalo, is building several additions to its plant at Clinton Street, Baltz Avenue and the Erie Railroad, including a foundry double the size of its present foundry. The enlarged plant will give employment to 600 additional men.

The Robertson-Cataract Electric Co., Buffalo, has taken out building permit for a six-story addition for factory and warehouse purposes at its plant at South Elmwood Avenue and Niagara Street, to cost \$80,000.

The Quale Garage Co., Buffalo, has filed plans for a service station and repair shop at Main Street and Rodney Avenue, to cost \$40,000.

Philpott & Leuppie, 377 Fourth Street, Niagara Falls, will erect a factory addition, 27 x 128 ft., one story, to cost about \$10,000.

The Niagara Brass & Mfg. Co., Buffalo, has purchased the Holly Co.'s shops at Lockport, N. Y., and will fit them up for use as a brass foundry and machine shop.

The Jamestown Tool & Die Works, Jamestown, N. Y., has awarded general contract to the Warren Construction Co., Gokey Building, Jamestown, for construction of a machine shop, 80 x 185 ft., one story, to cost \$30,000. Nels Johnson is president.

Rice & Adams, manufacturers of dairy machinery and supplies, Buffalo, have broken ground for an extensive addition to its plant on Chandler Street and the New York Central Railroad Belt Line.

The Lackawanna Bridge Co., Buffalo, has secured contract for the erection of an additional plant for the United States Alloys Co., Niagara Falls, N. Y.

The Corning Glass Works, Corning, N. Y., will erect a power house, 50 x 80 ft. Plans are being drawn by S. Firestone, engineer, Granite Building, Rochester.

The Navy Department, Department of Air Service, Washington, is arranging for an appropriation of \$360,000 for the acquisition of the Elmwood Street (Buffalo) plant of the Curtiss Aeroplane & Motor Corporation. Considerable equipment and machinery there is owned by the Government. An appropriation of \$3,260,000 is also planned for the purchase of the Dayton-Wright field and works at Dayton, Ohio.

The Erie City Iron Works, East Avenue, Erie, Pa., is planning the erection of a one-story addition, 40 x 122 ft., to cost \$14,000.

The O. R. Adams Mfg. Co., St. Paul Street, Rochester, N. Y., manufacturer of metal-working equipment, has had plans prepared for a one-story addition, 50 x 90 ft., to cost \$15,000. The company recently increased its capital from \$30,000 to \$150,000. F. H. Brown is president.

Following negotiations under way for some time past, the Pierce, Butler & Pierce Mfg. Co., Syracuse, N. Y., has concluded the purchase of the works of the Ames Iron Works, Oswego, N. Y., for a consideration said to be over \$1,000,000. The plant has been used for the manufacture of engines and boilers, giving employment to about 400 men and will be maintained at the present operating status.

The Hinckly Towing Co., Oswego, N. Y., is planning for the erection of a new ship repair works on a local site. The plant is estimated to cost about \$100,000 and will include machine tools and machinery for ship repairs and construction, dry dock, marine railway line, cranes, hoisting machinery, etc.

The Porter-Cable Machine Co., 501 East Water Street, Syracuse, N. Y., manufacturer of machine tools and machinery, has increased its capital from \$150,000 to \$425,000.

The Colonial Machine Co., Syracuse, N. Y., has increased its capital from \$100,000 to \$200,000.

Baltimore

BALTIMORE, June 16.

The Ordnance Department, Washington, has inaugurated active work in the Baltimore section for the removal of war equipment and machinery from a number of local plants heretofore engaged in the manufacture of munitions. Among the works are the plants of the Bartlett Hayward Co., including the South and Turners Station plants and the Columbia Avenue works. This latter was erected by the Government and most of the equipment is Federal property. It is proposed to remove the material to the Frankford Arsenal, Philadelphia, which is now being enlarged, while other equipment will be sent to the storage arsenal at Chicago. Other plants at which work is now under way for dismantling are those of the Hess Steel Corporation, with equipment for the

production of electric steels; the Crown Cork & Seal Co., Highlandtown, with plant for the manufacture of small cartridge case parts, etc., and the John T. Lewis & Brothers Co., with works at Carroll Park, this latter plant equipped to produce bullets for shrapnel manufacture at the Bartlett Hayward works. It is said that the work will require several months to complete. The district Ordnance Bureau has removed its local offices from 110 East Lexington Street to the main building at the Park plant of the Bartlett Hayward Co.

The Bethlehem Shipbuilding Corporation, Sparrows Point, Md., is arranging to increase its working force with the addition of boilermakers, coppersmiths, shipfitters and others.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans drawn for an addition to the power plant at the naval station at Indian Head, Md.

The W. H. Camp Co., Petersburg, Va., is planning the construction of a fertilizer plant on the River Road, to cost \$50,000. M. A. Camp is president.

The Canion Air Brake Co., 563 Calvert Building, Baltimore, has purchased an 8-acre tract and will begin work soon on a reinforced concrete machine shop, 60 x 200 ft., which will have about 24,000 sq. ft. of floor space. Later a foundry, pattern shop and office building will be constructed. W. G. Canion is president.

The Baltimore Marine Boiler Works, Woodall and Clement streets, Baltimore, will install a 50-hp. boiler.

The Sampson Oil & Fertilizer Co., Clinton, N. C., is in the market for second-hand 50-hp. Corliss engines.

The Bass Foundry & Machine Co., Fort Wayne, Ind., is understood to be planning the construction of a plant at Rock Run, Ala., to cost about \$300,000. It will be devoted to the manufacture of car wheels, railroad axles, Corliss engines, boilers, etc.

The A. R. G. Auxiliary Spring Co., Birmingham, Ala., plans to establish a plant to manufacture auxiliary springs for automobiles. Quotations are wanted on presses, punches, shearing machines, threading machines, ovens, etc. E. P. Kirkpatrick is secretary.

Chicago

CHICAGO, June 16.

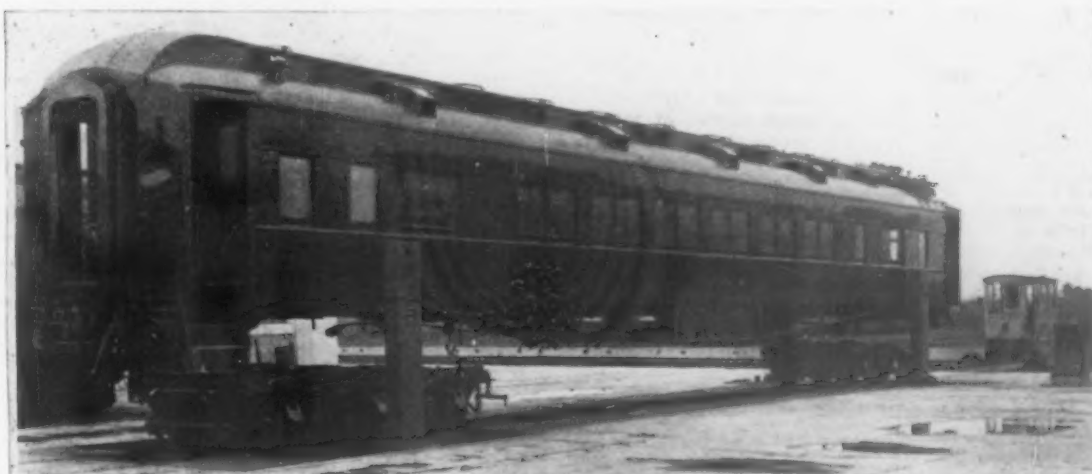
The volume of business continues good and inquiries have shown a noticeable increase within the last few weeks. While the bulk of orders continues to be for one or two machines, some consumers are showing a disposition to buy more heavily than they have in the past few months. Two large lists are before the trade, one issued by the Worthington Pump & Machinery Corporation, Cudahy, Wis., and the other by the Chicago Pneumatic Tool Co., covering its requirements for its new Franklin, Pa., plant. They follow:

Chicago Pneumatic Tool Co. List

Four automatic lathes.
Two 6-ft. radial drill presses.
One 4-ft. radial drill press.
One 24-in. boring mill.
One 61-in. boring mill.
One 36-in. vertical boring mill.
One boring mill (must be 26 1/16 in. from top of table to center of bar and have a 5-in. diameter bar).
One floor boring mill to be used for a horizontal drill press. Horizontal travel should be not less than 30 in. and vertical travel not less than 37 in.
One horizontal boring mill with a length of 5 ft. between facing arms.
One vertical milling machine.
One horizontal milling machine.
Two 32-in. x 16-ft. engine lathe with taper attachment and cone drive.
One 32-in. x 10-ft. engine lathe with taper attachment and cone drive.
One 36-in. x 12-ft. engine lathe with taper attachment and cone drive.
One 48-in. x 16-ft. engine lathe with taper attachment and cone drive.
One 18-in. x 8-ft. engine lathe with taper attachment and cone drive.
One 16-in. shaper.
Two sensitive spindle drill presses.
Four hardening furnaces, oil fired.
One 3000-lb. steam hammer.
One 36-in. x 36-in. x 12-ft. horizontal spindle milling machine for keywaying shafts.
Four motordriven dry grinding machines for tool grinding.
One bench grinding machine.
One 12-in. x 4-ft. speed lathe with chuck.



The electrically operated screw jack illustrated has been developed for removing the trucks from railroad passenger, interurban or street cars, by the Whiting Foundry & Equipment Co., Harvey, Ill. After the cars have been lifted and the trucks removed, they are lowered to shop trucks and the car or coach removed to another location. The machine is designed to lift a car by engaging the sills on heavy steps which raise and lower as the screws in the jacks revolve. After the steps have been adjusted, all four jacks are connected by clutches and each step raises at the same speed, keeping the car level.



- One 30-in. vertical spindle disk sander.
- One 36-in. bandsaw frame.
- One 15-ton 60-ft.-span electric traveling crane.

Worthington Pump & Machinery Corporation List

- One multiple 12-spindle drill for $\frac{3}{4}$ -in. drill.
- One 3-ft. radial drill.
- Two 36-in. motor-driven vertical turret lathes.
- One horizontal broaching machine for keyseating flywheels.
- One vertical broaching machine.
- One horizontal drill to handle 4-in. taps.
- One multiple 12-spindle drill for $1\frac{1}{4}$ -in. drilled holes.
- One special cylinder-boring machine.
- One 4-ft. radial drill.
- One multiple 6-spindle $\frac{5}{8}$ -in. drill.
- One special multiple 6-spindle drill for $\frac{3}{4}$ -in. tap in cylinder ends.
- One 4-spindle valve seat-grinding machine.
- Three milling machines.
- One 12-in. x 50-in. grinder for pistons, with cam-grinding attachment.
- One pulley boring and turning lathe to handle pulleys from 4 in. to 20 in.
- One machine for drilling and tapping pulley hubs.
- One gear hobber for cam gears.
- One 3-in. 2-spindle turret lathe.
- Two $1\frac{1}{2}$ -in. hand screw machines.
- One $1\frac{1}{4}$ -in. 4-spindle automatic screw machine.
- One 16-in. x 72-in. grinder for crankshafts.
- One 20-in. x 14-ft. lathe for crankshafts.
- One 24-in. x 14-ft. lathe for crankshafts.
- Two 36-in. x 16-ft. lathes for crankshafts.

- One high-speed sensitive drill with water attachment for cotterpin holes.
- One bench drilling machine.
- One 24-in. shaper.
- One 24-in. x 12-ft. lathe.
- One 18-in. x 14-ft. lathe.
- One 24-in. x 14-ft. lathe.

The Collins Rotary Safety Razor Co., which is building a \$100,000 plant on West Lake Street, between Forty-third and Forty-fourth avenues, Chicago, recently placed 17 automatic screw machines, 10 punch presses, miscellaneous tool-room equipment, buffing machinery, 3 hardening furnaces, 2 riveting machines, 2 high-speed drill presses and special worm milling machinery. The Haynes Automobile Co., Kokomo, Ind., has already commenced the purchase of tools required in the large addition which it is constructing. In the equipment which is so far placed are included 7 Warner & Swasey turret lathes and a number of grinding machines.

The railroads continue inactive. The Atchison, Topeka & Santa Fe, however, is at present inquiring for a 30-in. driving wheel lathe.

Agricultural implement manufacturers are curtailing operations and the tractor business is exceedingly dull. Tractors seem to be a drug on the market. Manufacturers are said to have large stocks on hand which they cannot dispose of. The farmer who is notoriously conservative in buying cannot be induced to pay the increased prices of the present day. Two years ago a widely advertised and widely sold tractor was offered to the farmers at \$885. To-day the same tractor, practically unchanged in appearance or ability to perform, cannot be bought for less than \$1,585.

H. C. Elliott, formerly vice-president of the Marshall &

Huschart Machinery Co., Chicago, has organized the Elliott-Stephens Machinery Co., which has taken over the business of the St. Louis office of the Marshall & Huschart Machinery Co.

A manufacturer of automatic screw machines is effecting European connections for the sale of tools in Poland and other eastern European countries.

The Ursus Motor Co. has purchased 16 acres at Grand and Fullerton avenues, Chicago, where it will erect a plant for the manufacture of trucks and tractors.

The B. Mercil & Sons Plating Co., 1911 Fulton Street, Chicago, has awarded contracts for the erection of a one-story addition, 32 x 99 ft.

The Rue Motor Co. has awarded a contract to Holton, Seelye & Co., 140 South Dearborn Street, Chicago, for the construction of a one and two-story factory, 50 x 161 ft., at 2440-42 Indiana Avenue.

The Independent Tool Corporation, 139 South Irving Avenue, Chicago, has awarded contracts for the erection of a one-story plant, 51 x 115 ft., at 923-27 South Keeler Avenue.

The Ilg Electric Ventilating Co., manufacturer of fans and blowers, is erecting a two-story plant at the southwest corner of Crawford Avenue and George Street, Chicago.

Bodach & Sons, showcase manufacturers, 1724 North Winchester Avenue, Chicago, suffered \$20,000 damage as the result of a fire in their plant on June 5.

Murray Nelson, care of Calumet & Chicago Coral & Cocks Co., 238 South Dearborn Street, Chicago, has awarded a contract for the erection of a one-story machine shop, 118 x 126 ft., to cost about \$40,000.

The Pollak Steel Co. will extend its drop forging plant at South Chicago, Ill.

The Stover Mfg. & Engine Co., East Freeport, Ill., is erecting a new plant, 48 x 75 ft., one story.

The National Tube Co. will commence the construction of a \$25,000,000 plant at Gary, Ind., in July.

The Huffman Motor Co., Elkhart, Ind., has purchased a tract south of its plant where it will construct an addition.

The Evans Tire Co., Fort Wayne, Ind., has equipped a factory at 1807 Weissner Park Avenue, where it will engage in the renewal of automobile tires.

The United Automatic Water Heater Co., Gary, Ind., has been organized with a capital stock of \$100,000 to manufacture heaters. The incorporators include James H. Daniels, Keith F. Southern and C. C. Weaver.

The Liberty Wire Nail Machine Co., Inc., has acquired the plant of the Kokomo Trunk Co., Kokomo, Ind., and will remodel it into a machine shop.

The Blount Plow Works, Evansville, Ind., has purchased the Hartman Mfg. Co., manufacturer of agricultural implements, Vincennes, Ind.

The Lake Erie & Western Railroad plans the erection of a power house, machine shop and 10 additional engine stalls at Peru, Ind.

The Shrauger & Johnson Co., manufacturer of lightning rods, Atlantic, Iowa, has secured a tract, 40 x 50 ft., adjoining its plant, where it plans to erect an addition. The company contemplates manufacturing steel fence posts in addition to its present product.

The Waterloo Construction & Machine Co., Waterloo, Iowa, has let a contract for the erection of an addition to cost about \$20,000.

The Crucible Welding Co., Davenport, Iowa, will erect a \$10,000 plant at 307-311 Pershing Avenue.

The Independent Motor Truck Co., Davenport, Iowa, recently increased its capital stock from \$50,000 to \$150,000.

Geraghty & Co., 3035 West Lake Street, Chicago, manufacturer of metal novelties, etc., is having plans prepared for the erection of a one and two-story addition to cost about \$25,000.

The Barber Asphalt Paving Co., Land Title Building, Philadelphia, is having plans prepared for the erection of a new refining plant at Madison, Ill., to be used as an extension to the present works at this location. The new plant, with machinery and equipment, will cost about \$400,000.

The All-American Truck Co., 2952 West Chicago Avenue, Chicago, is having plans prepared for the construction of a new one-story foundry, 80 x 600 ft., estimated to cost about \$75,000.

The Belden Mfg. Co., 2301 South Western Avenue, Chicago, manufacturer of electrical wires and cables, etc., is having plans prepared for the erection of an addition to its plant to cost about \$150,000. The structure, to be known as Building No. 8, will be four stories, brick and concrete, 90 x 160 ft.

New England

BOSTON, June 16

The machinery dealers of New England seem very well satisfied with current orders and with the volume of inquiries. Some large lists have been closed, most notable of which is that of the Westinghouse company for its Springfield, Mass., plant, which totals many thousands of dollars. The Fellows Gear Shaper Co., Springfield, Vt., has made important purchases and dealers expect other business from this source with the completion of the large additional building, plans for which are completed. There is also a considerable smattering of smaller orders in the New England territory.

The Foss & Bump Co., Springfield, Mass., incorporated with a capital stock of \$100,000, has secured space in a factory building at Dwight and Taylor streets and will manufacture leather belting. The officers are W. J. Foss, president, and Harry J. Foss, vice-president, both of Fittsfield, Mass., Charles H. Bump, Jr., treasurer, and D. R. Johnson, both of Springfield, Mass. Charles J. O'Brien, superintendent, formerly of Worcester, Mass.

The Columbia Graphophone Co., Bridgeport, Conn., has purchased some adjoining property to its plant from the Remington Typewriter Co., the amount involved approximating \$1,000,000. The plant was originally built for the manufacture of the Sharpe rifle.

The New Departure Mfg. Co., Bristol, Conn., has purchased a tract of land containing 29 acres. This will be used for the erection of an addition to the Elmwood plant and will also furnish sites for homes to be built for the company's employees.

The Mills Machine Co., Lawrence, Mass., has bids in for the erection of a machine shop, 96 x 160 ft., to cost \$60,000.

The Seamless Rubber Co., New Haven, Conn., has placed a contract for a manufacturing plant to be erected forthwith. Complete details of the equipment for the power plant and factory are not yet determined by engineers. The total cost is estimated at \$1,000,000.

A factory, three stories, 40 x 100 ft., \$25,000, is to be built for the Schwarztel Stamping Co., Bridgeport, Conn.

Additions to the power plant are to be started at once for the Massachusetts Cotton Mill, Lowell, Mass. Extension of building will be one story, 29 x 90 ft.

The Cashiko Machine Co., Worcester, Mass., incorporated a month ago with a capital stock of \$50,000 to build special machinery and tools, has obtained a shop in the Kelley Building, Foster Street. John Kovar, Woonsocket, R. I., is president, and Alexander Cavedon of the same city is treasurer.

The American Hardware Corporation, New Britain, Conn., has had plans drawn for the erection of a five-story addition to its local plant, 50 x 120 ft.

The Robertson Motor Car Co., School Street, Taunton, Mass., will build a new three-story machine shop and automobile service works, 110 x 110 ft., on Trescott Street, to cost about \$75,000, including equipment.

The American Brass Co., Waterbury, Conn., will build a new one-story brick power plant to cost about \$50,000.

A new machine shop and auto service works for company trucks and cars will be erected by the Hartford Electric Light Co., Hartford, Conn., on Sheldon Street, at a cost of about \$34,000.

The Board of Works, Boston, Mass., in conjunction with the National Board of Fire Underwriters, has arranged for extensive additions in the local high pressure water system. Plans are being prepared for the installation of two multi-stage turbine centrifugal pumps, each with capacity of about 3000 gal. per min., at the power station of the Boston Elevated Railroad at Lincoln Street, and for two electric-driven units of same size and capacity at the electric power station of the Edison Electric Illuminating Co., Atlantic Avenue. The installation will include auxiliary operating equipment at both plants. Later it is planned to install a third pumping unit of similar capacity at each of the plants. It is also proposed to install two additional motor-driven pumps at the Edison company's electric station on Stanhope Street.

The Miller Wire Cloth Co., Worcester, Mass., has filed notice of dissolution. It was recently acquired by the Morgan Spring Co., New Bond Street.

B. F. Perkins & Son, Inc., Holyoke, Mass., operating a machine works at 2 Crescent Street, is considering the construction of a new plant on property recently acquired at Willimansett, Mass.

The Ideal Machine Co., East Main Street, Plainville, Conn., is the new corporate style and address of the Ideal Switch & Machinery Co.

Cleveland

CLEVELAND, June 16.

One of the largest orders for machine tools that has come out in this section for some time was placed the past week by the General Motors Corporation with the Defiance Machine Works, Defiance, Ohio, and includes multiple drilling and other types of machines, largely of a special character. It is understood that the order amounts to about \$1,500,000. A local builder of turret lathes and screw machines has just taken a round lot order of machinery for export to France and Belgium. Generally the market is quite active, dealers reporting a very good volume of business in small orders. There is also a fair volume of new inquiry pending of 10 to 15 machines. The bulk of the demand is still coming from the automobile and allied fields. Tire manufacturers continue to buy quite freely. Deliveries on some machines, including large lathes and milling machines, planers, and grinders, are rather slow. One maker of milling machines is not promising shipments before October.

Some machine-tool builders are talking of advancing prices. They state that the reductions they made some time ago to get business under way when the market was inactive, left a very small marginal profit and that the cost of manufacture is showing an upward tendency. One or more shaper manufacturers have already advanced prices. Some of the local machine tool builders have received intimation that the price of machinery castings may be advanced from $\frac{1}{2}\text{c}$. to $\frac{1}{4}\text{c}$. per lb. as a result of the recent advance in molders' wages. Conditions in Cleveland foundries are improving somewhat, as reports show that more new molders are being employed than are being laid off.

No lists of Government-owned machines have as yet come out in this district but local dealers have received from the Philadelphia District Salvage Board of the War Department a list of approximately 300 machines in the plant of the Eddystone Munitions Co., Eddystone, Pa.

Cleveland machinery houses have received an inquiry from the McGraw Service Shop, Butte, Mont., for three universal milling machines, three universal grinders and a 24-in. lathe.

The Cleveland Rubber Mold & Foundry Co., 408 Schofield Building, has acquired a 10-acre site on Warren Road, and is having plans prepared for two buildings, each 120 x 240 ft., which will include a pattern shop, machine shop, and foundry. The company will manufacture tire cores and molds. I. R. Davies is president and G. R. Fairfield, secretary.

The plant to be erected by the new Machined Steel Casting Co., Alliance, Ohio, will include a main building 75 x 400 ft. with a 30 ft. lean-to on each side, an open hearth building, 90 x 125 ft. and an office building. The company is closely affiliated with the Alliance Machine Co., and W. H. Purcell, president of the latter company, is also president of the foundry company. The plant will be under the management of W. E. Trump, who will also be first vice-president. Mr. Trump for seven years has been superintendent of the Alliance plant of the American Steel Foundries. Other officers are Fred R. Donaldson, second vice-president and sales manager; H. Y. Stuckey, secretary; J. D. Freer, treasurer and purchasing agent, and H. R. Donaldson, general superintendent. Fred R. Donaldson is assistant general manager; R. H. Donaldson, superintendent, and Mr. Freer is supply agent of the Alliance plant of the American Steel Foundries. Mr. Stuckey is assistant general manager of the Alliance Machine Co. It is expected that the plant will be ready for operation about July 1.

The Defiance Machine Works, Defiance, Ohio, to provide capacity to turn out large orders for equipment for automobile plants will build a new foundry and make such other extensions as are needed. The company announces that it will put its plant on full day and night shifts and will increase its working force from 500 to 600 men.

The Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, is considering the erection of a foundry in connection with its plant.

Cincinnati

CINCINNATI, June 16.

There is a continued large demand for boring mills from automobile tire manufacturers, or from firms supplying these makers with tire molds. A better domestic inquiry for lathes is also reported, but orders placed are mostly for single tools. Railroad buying is very slow. Export business continues fairly good and some recent orders have been received for machines to be shipped to France and Belgium. Orders from Spain and Great Britain are few. Japanese inquiries, through exporting houses, are coming in at a steady rate, although no large sales have been reported within the past

few days. Small tool and die makers in this vicinity are busier than at any time since the armistice was signed.

C. H. M. Atkins and B. B. Quillen, Cincinnati machinery manufacturers, have purchased the new plant of the Champion Tool Works Co. from H. W. Kreuzburg and A. H. Rosenberg for approximately \$300,000. The property of the Champion company includes buildings with about 100,000 sq. ft. of floor space, and consists of six acres of land on Spring Grove Avenue, at Winton Place. The buildings are of brick and steel construction, saw-tooth type, and located on the main line of the Baltimore & Ohio Railroad, with a private spur. The purchasers also control the Acme Machine Tool Co., 2235 Buck Street, the Cincinnati Planer Co., South Street, Oakley, and the Greaves-Klusman Tool Co., 2420 Spring Grove Avenue. It is proposed to locate the Acme and the Greaves-Klusman companies in the newly acquired Champion works. Other buildings are to be added and approximately 1000 men will be employed. Messrs. Atkins and Quillen, two years ago, acquired the Greaves-Klusman property.

The entire pumping machinery business of the Canton-Hughes Pump Co., Wooster, Ohio, has been purchased by the Chalmers Pump & Mfg. Co., Lima, Ohio, which company is a reorganization of the Chalmers Mfg. Co., with increased capital and manufacturing facilities necessary for the new business. The officers of the Chalmers Pump & Mfg. Co. are C. S. Brown, president; Frank D. Shumate, vice-president and sales manager; Fred Biszantz, secretary and treasurer. Messrs. Brown and Biszantz, as executives of the Chalmers Mfg. Co., have been active and successful founders and machinery builders. Mr. Shumate of Chicago, who has become associated with the new organization, brings to it experience in the engineering and sales field of pumping machinery gained through his connection with the Worthington Pump & Machinery Corporation for the past 13 years throughout the Middle West, Southwest, Mexico and Canada. He is a member of the American Society of Mechanical Engineers. The Canton-Hughes Pump Co. has been well known as a manufacturer of single and duplex steam and power pumps, air compressors, jet and surface condensers for medium vacuum work and many special pumps for special purposes. The manufacture of the line will be actively continued. The general offices and works will be at Lima, Ohio, with agents in all of the principal cities.

The Dayton Insulating Die Co. and the Dayton Oxygen & Hydrogen Products Co., Dayton, allied companies, have let contract for a two-story factory that will contain 20,000 sq. ft. of floor space. C. A. Kurz, Jr., is vice-president and general manager.

The Chaney Mfg. Co., Springfield, Ohio, maker of advertising specialties, has had plans prepared for a new plant estimated to cost \$60,000. L. F. Chaney is president.

It is reported that the Domestic Engineering Co., Dayton, has plans under way for an addition to its plant.

Milwaukee

MILWAUKEE, June 16.

Increasing activity is noted in the machine tool trade. New business is assuming more satisfactory proportions, and the demand is better than at any time in the last 60 days. The feeling of hesitancy among buyers is disappearing and local tool builders look for some important developments shortly after July 1.

Steel foundries state that orders are reappearing but business is not yet up to plant capacity. Grey iron foundries are generally operating at maximum capacity.

Structural fabricators and erectors have booked a number of large and numerous small jobs which are keeping shops busy for 60 to 90 days. New business, however, has come spasmodically.

The Vilter Mfg. Co., 872 Clinton Street, Milwaukee, manufacturer of ice and refrigeration machinery, Corliss engines, etc., has awarded contracts to Westinghouse Church Kerr & Co., 37 Wall Street, New York, for the erection of a new three-story office building, 70 x 120 ft., of brick and concrete, and a one-story reinforced concrete auxiliary foundry building, 39 x 80 ft., estimated to cost \$115,000. Permits have been granted and work started the past week.

The F. J. Greene Engineering Works, Racine, Wis., is erecting a one-story brick and steel addition providing 15,000 sq. ft. of additional floor space for the manufacturing department, to be available about Aug. 15. The building will cost \$25,000 not including equipment.

The Charles Skidd Mfg. Co., Janesville, Wis., manufacturer of dairy and creamery devices and appliances, has increased its capital stock from \$150,000 to \$200,000 to finance the expansion of its business and facilities. Some new metal-working equipment is being installed from time to time, and later in the year a shop addition probably will be made. Peter V. Kuhn is secretary.

The Milwaukee Tank Works, 851 Kinnickinnic Avenue, Milwaukee, which lost its plant by fire several months ago, has broken ground for a new shop, 100 x 260 ft., and a warehouse, 80 x 100 ft. The general contractor is W. M. Tuckwell, R. R. 2, Station D, Milwaukee.

The Menasha Boiler Works, Menasha, Wis., which has been incorporated with a capital stock of \$50,000, will build a boiler and structural shop, 60 x 150 ft., and will manufacture steam boilers, metal tanks and digesters for paper and pulp mills, and similar equipment. William J. Hess, former owner of the Manitowoc Boiler Works, is president of the company, the other principals in which are William A. Bruce and Arthur J. Strange, Menasha.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric cranes, hoists, etc., has purchased 7½ acres adjacent to its main works at Thirty-eighth and National avenues for \$50,000. It will be utilized for future extensions as warranted by the volume of business. It is reported that the company is intending to erect its own steel foundry, but no official information is available concerning this project. Henry Harnischfeger is president.

The Seeger Mfg. Co., Chicago, manufacturer of sheet-metal heaters for private garages, summer homes and similar purposes, has moved its plant and equipment to Wausau, Wis., where for the present manufacturing operations will be conducted in connection with the plant recently established by the Wisconsin Valley Sheet Metal Works. Later a separate factory will be erected. Max Seeger is general manager.

The C. A. Shaler Co., Waupun, Wis., manufacturer of electric, gas and steam vulcanizing machinery, has plans for a three-story addition, 50 x 100 ft., of brick and reinforced concrete. Some new tool and other equipment will be installed.

The Ogren Motor Car Co., Milwaukee, with a capital stock of \$500,000, has been incorporated to manufacture motor cars, engines, parts and accessories. Details of the company's plant will be issued shortly. The incorporators are Harry Kuntz, M. Landeck and E. Patek.

The Parker Pen Co., Janesville, Wis., manufacturer of fountain pens, has awarded the general contract to the Raulf Co., 53 Patton Building, Milwaukee, for the construction of a five-story factory building, office and power house, estimated to cost \$300,000 complete. The architect is Frank A. Carpenter, Rockford, Ill. George S. Parker is president.

The Board of Education, Washburn, Wis., has definitely decided to proceed with the erection of a new high school and vocational training institute, the cost not to exceed \$100,000 with complete equipment. An architect is being selected.

W. V. Taylor has disposed of his interests in the Merrill Iron Works, Merrill, Wis., established about two years ago.

The Board of Education, Beloit, Wis., has disposed of a bond issue of \$245,000 for the construction of a new east side high school and vocational training institute, plans for which are now in preparation. Bids probably will be taken late in June so the building may be ready for occupancy in September.

The Badger Tool Co., Beloit, Wis., has been incorporated with a capital stock of \$75,000 to manufacture disk-grinding machinery and equipment. It plans to bring out a line of special grinding machinery. The officers are E. B. Gardner, president; C. E. Cadman, vice-president; H. I. Kelley, secretary, and R. D. Gardner, treasurer. E. B. Gardner was formerly secretary of the Gardner Machine Co., Beloit, with which concern the other officers were also connected.

Pittsburgh

PITTSBURGH, June 16.

The Helca Coal & Coke Co., Pittsburgh, has been granted permission to build a steel coal tippie on the Monongahela River.

The Duff Mfg. Co., Preble Avenue, Pittsburgh, manufacturer of jacks, trench braces, etc., will build a one-story foundry addition, 80 x 160 ft., to cost \$30,000.

The Johnstown Auto Co., Johnstown, Pa., is building a two-story machine shop and service works, 65 x 120 ft., to cost, with proposed equipment, over \$100,000.

The American Valve & Tank Co., Fairmont, W. Va., recently reorganized, is planning the immediate reopening and operation of its local plant. It is expected to commence shipments around July 15.

The Elkins Garage Co., Elkins, W. Va., recently incorporated with a capital of \$75,000, is planning the erection of a two-story machine works and service shop, 90 x 150 ft. J. R. Kemper and H. B. Shaver head the company.

The New River Co., Mount Hope, W. Va., will build a

machine shop, 90 x 100 ft. Prices are wanted on motor-driven power hammers, power-driven punch and shears, turning lathes, engine lathes, press for straightening axles, milling machine, drill press, hack saws, cold saws, 10-ton crane, bridge crane, 1½ and 2-ton cranes, shapers and planers, line shafting, etc. M. C. Moore, Macdonald, W. Va., is purchasing agent.

The Mahoning Foundry Co., Youngstown, Ohio, has increased its capital stock from \$65,000 to \$150,000 to take care of recent extensions.

It is announced from Delaware, Ohio, that the James Maher Pipe Tongs & Wrench Co., Wheeling, W. Va., will locate in that city and will build a plant for the manufacture of pipe tongs. G. A. Jocke, W. D. Richey and H. S. Williamson are interested.

Indianapolis

INDIANAPOLIS, June 16.

Business the first two weeks of June has been of a volume closely approaching that during the war, and so many inquiries are coming in that the trade views the future with a great deal of assurance. Orders from automobile industries and makers of automobile accessories continue, while a number of new mills now being erected have added to the steadily growing demand.

The Noblesville, Ind., Chamber of Commerce signed a contract with the New Process Iron & Steel Company, Columbus, Ohio, to locate in that city. The company was organized last week with a capital stock of \$200,000 and work on the new plant will start in the next fortnight.

The general offices of the Bull Tractor Co. are being moved from Minneapolis to Anderson, Ind. The company is now a part of the Bull Tractor-Madison Motor Corporation of that city.

J. W. Hobbs, president Home Elevator Co., 214 South Pennsylvania Street, has announced that work on a new factory will be started soon. The new building will be one-story, 100 x 150 ft., and the estimated cost is \$20,000. The equipment, which will include an electric crane, will cost an additional \$30,000. The officers are J. W. Hobbs, president; E. C. Gale, vice-president; August Hoffman, secretary; A. Gentry, treasurer and general manager.

The Godfrey Conveyor Co., Elkhart, Ind., has been incorporated with a capital stock of \$1,000,000 to manufacture machinery. The directors are John F. Godfrey, Byron C. Godfrey, Irvin D. Landis and J. Sumner Kirk.

The Hess Mercury Carburetor Mfg. Co., Kokomo, Ind., has been incorporated with a capital of \$50,000 to manufacture carburetors and automobile accessories. The directors are Willis C. Hess, Maude E. Talbert and Perl Rector.

The Atkins Safety Automatic Gate Co., South Bend, Ind., has been incorporated with a capital of \$100,000. The directors are Edward W. Sykes, Joseph B. Atkins and Harry A. Engman.

The Drury Engineering Co., Evansville, Ind., has been incorporated with \$50,000 capital to manufacture mechanical devices. The directors are Thomas W. Drury, Simon Bartholome, John W. Miller and Joseph F. Bartholome.

The Evansville Enameling Co., Evansville, Ind., is having plans drawn for the construction of a new one-story plant, 80 x 132 ft., for the manufacture of enamelware products. The structure is estimated to cost \$20,000. Russ & Karges, Furniture Exchange Building, are architects.

The Crescent Machine Works, Evansville, Ind., has filed notice of dissolution.

The Electrical Equipment Co., South Bend, Ind., has been incorporated with a capital of \$30,000 by Albert J. Weger, E. L. Burch and A. G. Graham, to manufacture electrical goods.

The Barth-Keith Motor Car Co., Indianapolis, Ind., has been incorporated in Delaware with capital of \$600,000 by Charles A. Barth, J. Ellis Keith and Jacob S. Barth to manufacture motor cars.

The American Lamp & Specialty Co., Evansville, Ind., has been incorporated with \$25,000 capital stock to manufacture lamps and specialties. The directors are James H. Powers, Patrick Hughes and Charles Martin.

The Liberty Car Wheel Co., Hammond, Ind., has been incorporated with \$500,000 capital stock. The directors are Charles Aaron, Franklin Raber and Charles E. Clark.

The Logansport Machine Co., Logansport, Ind., manufacturer of air-operated labor saving devices, will build a new factory to cost \$25,000.

The Montpelier Mfg. Co., Montpelier, Ind., is planning an enlargement of its plant on four acres of ground recently purchased adjoining its present property. The addition will be a pump factory and assembling room. Later a tank fac-

tory will be built. An order for 30,000 transmission gear cases has been booked from the Warner Gear Co., Muncie, Ind.

The W. N. Johnson Sheet Metal Co., Richmond, Ind., will increase the capacity of its plant to five times its present output. Two new buildings are being erected, one for the manufacture of automobile fenders.

St. Louis

ST. LOUIS, June 16.

The Phelps Compress Co., Little Rock, Ark., will build a compress requiring about \$35,000 worth of machinery.

C. L. Bird and others of Bird, Ark., will establish a cotton gin requiring about \$15,000 worth of machinery.

The Novelty Machine Works, New Orleans, La., Bruno Praeger, president, will erect a machine shop, 60 x 100 ft.

The Union Refining & Pipe Line Co., Shreveport, La., has increased its capital from \$100,000 to \$1,250,000 and will extend its plant and pipe line.

The New Orleans Dock Board, New Orleans, La., will equip a fruit wharf with mechanical conveyors and other machinery.

The Oklahoma Tire & Rubber Mfg. Co., Tulsa, Okla., capital \$1,000,000, Ed. L. Jones, Remington Rogers and others interested, will equip a plant for the manufacture of tires and other rubber products.

The city of Baton Rouge, La., will receive bids until July 1 for a direct connected motor driven vacuum pump, 100 hp., induction motor and other equipment. W. E. Atkinson is city engineer.

The White Star Refining Co., Detroit, Mich., will erect an oil refinery at Woodriver, Ill., and will lay a pipe line from that point to the Mississippi River at a cost of about \$300,000.

The Southwestern Gas & Electric Co., Texarkana, Ark., is planning for the erection of a new group of shop buildings to cost about \$60,000, to include machine and forge shops, wood-working and carpenter shops and other structures.

The Corning Custom Gin Co., Corning, Ark., recently incorporated with a capital of \$15,000, is planning for the construction of a new plant to cost about \$20,000. The installation will include machinery to cost \$7,500, with engine plant to be equipped with oil-operated unit. T. W. Wynn is president.

The Louisiana Railroad & Navigation Co., Shreveport, La., is considering the rebuilding of its local car and repair shops, recently destroyed by fire with loss estimated at \$100,000.

The National Tool & Mfg. Co., St. Louis, has increased its capital from \$100,000 to \$500,000 and changed its name to the Bluebird Mfg. Co.

The Rex Spray Co., Kansas City, Mo., manufacturer of spraying equipment, is taking bids for the erection of a new two-story and basement plant, 50 x 100 ft., at Twelfth and Charlotte streets, North Kansas City. Smith, Rea & Lovitt, Finance Building, are the architects.

Texas

AUSTIN, June 14.

The Southern Oil & Refining Co. will erect a refinery on the ship channel ten miles below Houston, to cost \$300,000.

The Producers & Refiners' Corporation with general offices at Denver, Colo., has taken over the Pan-American refinery in West Tulsa, Okla. Improvements are to be made by the new owners, including a general remodeling of the plant and the construction of a pipe line from the Beggs and the Youngstown pools in Okmulgee County to the refinery. A lubricating oil plant will probably be added in the near future. The company is also starting work on a 4-in. line from the Burkburnett, Texas, field, to Lawton, Okla., where a loading rack is under construction.

The Texas & Pacific Railroad shops at Marshall will be enlarged, according to announcement of J. L. Lancaster, federal manager.

The Columbian Refining Co., Houston, Texas, recently incorporated with a capital stock of \$500,000, is planning for the erection of a new oil refinery on the ship channel. The proposed works will be erected on the unit plan, the first unit to have a capacity of about 10,000 bbl. per day. W. A. Rogers and L. D. Moore head the company.

The Kreuger Machinery Co., San Antonio, Texas, has increased its capital stock from \$100,000 to \$200,000.

The Island Refining Corporation, Galveston, recently incorporated with a capital stock of \$10,000,000, is planning for the construction of a new oil refining plant at New Orleans,

La., with a daily capacity of about 5000 bbl.; the plant will be provided with equipment for loading and unloading tankers. A large site has been acquired in this section. George A. Burrell is president.

The Central South

LOUISVILLE, June 16.

B. F. Avery & Sons, Louisville, Ky., manufacturers of agricultural implements, are planning for the erection of additions to their plant to cost about \$200,000. Included in the expansion is a new two-story assembling works, 100 x 330 ft.

The Pullman Co., Chicago, Ill., is planning to rebuild its car repair shops near Ludlow, Ky., recently destroyed by fire with loss estimated at about \$100,000.

The Kentucky Wagon Mfg. Co. will start work immediately on a \$100,000 addition to its automobile manufacturing department.

The Pacific Northwest

SEATTLE, June 10.

Milling and elevator equipment is particularly active, with both lines of secondhand machinery in demand. Saw-mill and logging equipment has been selling in satisfactory volume. Many of the larger plants will close for the Fourth of July week to make needed repairs. This is the usual custom, and creates an increased demand for small equipment.

Steel shipyards in Portland have discharged 2500 workers the past week, according to the United States Employment Bureau in that city. The Northwest Steel Co. has laid off 1000 men, and the Columbia River Shipbuilding Corporation about 1500.

The American Can Co., Seattle, plans the enlargement of its plant, increasing its annual capacity from 100,000,000 to 125,000,000 cans. A new structure will be erected and new equipment installed. It employs about 500 people.

The Kane Pneumatic Shock Absorber Co., Centralia, Wash., has completed plans for its proposed foundry and machine shop, the main building to be one-story, 50 x 100 ft. New equipment will be installed.

Canada

TORONTO, June 16.

The demand for machine tools continues to hold. Although general activities are not of heavy volume, there is sufficient business to keep dealers hustling to fill requirements on account of the decreased output of plants experiencing labor difficulties. The outlook for machinery lines shows promising possibilities, but in some cases deliveries will be held up for a few months, partly due to the strike. Automobile companies continue to head the list of buyers of machine tools.

The John E. Russell Co., Harbor Building, Toronto, is in the market for three 100-hp. motors, 60 cycle, three phase, 500 r.p.m., complete with starter; three 50-hp. motors, 60 cycle, three phase, 700 r.p.m.; one 40-hp. motor, 60 cycle, three phase, 700 r.p.m., and one 10-hp. motor, 60 cycle, three phase, 700 r.p.m. This equipment, either new or second-hand, is wanted for immediate delivery.

The York Sandstone Brick Co., East Toronto, Ont., is in the market for an 18 x 72 return tubular boiler, 125 lb. steam pressure.

Gilpin Brothers, Warton, Ont., are in the market for a 30-in. automatic knife grinder.

An explosion in the boiler room caused considerable damage to the plant and machinery of William Cane & Sons, Newmarket, Ont., June 12. Work will be started immediately on the rebuilding of the plant, which will cost about \$40,000.

The Morrison Steel & Iron Works, Vancouver, B. C., has taken out a permit for the erection of a new plant on Industrial Island. It will be of mill construction and cost \$28,500.

The Stickney Motors, Ltd., St. Paul, Minn., will take over the old building of the cordage works recently vacated by the Renfrew Mfg. Co., Peterboro, Ont., and will install equipment for the manufacture of farm tractors, motor trucks and gasoline engines. Tax exemptions will be granted by the city.

The Provincial Machine Co. is making arrangements for the establishing of a plant at St. Thomas, Ont., for the manufacture of talking machines, parts, etc.

The Aero Cushion Tire Co., Wingham, Ont., recently organized, has purchased two buildings from the Western Foundry Co. and will install machinery for the manufacture of rubber tires, etc.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

Iron and Soft Steel Bars and Shapes

Per lb.

Bars:	
Refined iron, base price	3.37c
Burden's H. B. & S. bar iron, base price	6.10c
Burden's best bar iron, base price	6.30c
Swedish bars, base price	20.00c
Soft Steel:	
¾ to 1 ½ in., round and square	3.37c
1 to 6 in. x ¾ to 1 in.	3.37c
1 to 6 in. x ¼ and 5/16	3.47c
Rods—¾ and 1 1/16	3.42c
Bands—1 ½ to 6 x 3/16 to No. 8	4.07c
Shapes:	
Beams and channels—3 to 15 in.	3.47c
Angles:	
3 in. x ¾ in. and larger	3.47c
3 in. x 3/16 and ½ in.	3.72c
1 ½ to 2 ½ in. x ½ in.	3.52c
1 ½ x 2 ¾ in. x 3/16 in. and thicker	3.47c
1 to 1 ¼ in. x 3/16 in.	3.52c
1 to 1 ¼ in. x ½ in.	3.57c
¾ x ¾ x ½ in.	3.62c
¾ x ½ in.	3.67c
¾ x ¼ in.	4.47c
½ x 3/32 in.	5.17c
Tees:	
1 x ¾ in.	3.87c
1 ¼ in. x 1 ¼ x 3/16 in.	3.77c
1 ½ to 2 ½ x ¼ in.	3.57c
1 ½ to 2 ½ x 3/16 in.	3.57c
3 in. and larger	3.52c

Merchant Steel

Per lb.

Tire, 1 ½ x ½ in. and larger	3.37c
Toe calk, ½ x ¾ in. and larger	4.25c
Open-hearth spring steel	6.00c
Standard cast steel, base price	14.00c
Extra cast steel	18.00 to 20.00c
Special cast steel	23.00 to 25.00c

Tank Plates—Steel

Per lb.

¼ in. and heavier	3.67c
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Sheets

Blue Annealed

Per lb.

No. 8 and 3/16 in.	4.52c
No. 10	4.57c
No. 12	4.62c
No. 14	4.67c
No. 16	4.77c

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined per lb.
Nos. 18 to 20	5.17c	
Nos. 22 and 24	5.22c	6.55c
No. 26	5.27c	6.60c
No. 28	5.37c	6.75c
No. 30	5.57c	
No. 28, 36 in. wide, 10c higher.		
Wood's Keystone Hammered, 18-24 gage, 9¾c; 26-28 gage, 10¼c.		

Galvanized

Per lb.

No. 14	5.60c
No. 16	5.75c
Nos. 18 and 20	5.90c
Nos. 22 and 24	6.05c
No. 26	6.20c
No. 27	6.35c
No. 28	6.50c
No. 30	7.00c
No. 28, 36 in. wide, 20c. higher.	

Corrugated Roofing, Galvanized

2 ½ in. corrugations, 10c. per 100 lb. over flat sheets.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per lb.
Bright basic	5.25c
Annealed soft	5.25c
Galvanized annealed	6.00c
Coppered basic	6.00c
Tinned soft bessemer	7.25c

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High Brass Sheet	21c	to 22 ¾c
High Brass Wire	21c	to 22 ¾c
Brass Rod	19 ½c	to 21c
Brass Tube	31 ¾c	to 36c

Copper Sheets

Sheet copper, hot rolled, 16 oz., 25 ½c. to 28c. per lb. base.	
Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.	

Tin Plates

Bright Tin	Grade	Grade	Coke—14x20	Primes	Wasters
	"AAA"	"A"			
	Charcoal	Charcoal	80 lb.	\$8.30	\$8.05
	14x20	14x20	90 lb.	8.40	8.15
			100 lb.	8.55	8.30
IC	\$11.30	\$10.05	IC	8.80	8.55
IX	13.50	12.00	IX	10.00	9.75
IXX	15.25	13.75	IXX	10.95	10.70
IXXX	17.00	15.50	IXXX	11.90	11.65
IXXXX	18.75	17.25	IXXXX	12.85	12.60

Terne Plates

8-Lb. Coating 14x20

100 lb.	\$8.50
IC	8.65
IX	9.65
Fire door stock	11.50

Tin

Straits pig	74c to 75c
Bar	80c to 85c
American pig, 99 per cent	70c to 72c

Copper

Lake Ingot	18c to 19c
Electrolytic	17 ½c to 18 ½c
Casting	17c to 18c

Spelter and Sheet Zinc

Western spelter	8 ½c to 9c
Sheet zinc, No. 9 base, casks	12c; open 13c

Lead and Solder*

American pig lead	6c to 6 ½c
Bar lead	7 ½c to 8 ½c
Solder ½ & ½ guaranteed	45c
No. 1 solder	40c
Refined solder	34c

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c
Commercial grade, per lb.	50c

Antimony

Asiatic	9 ½c
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	37c to 39c
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Old Metals

The market is stronger. Dealers' buying prices are nominally as follows:

	Cents
Copper, heavy and crucible	15.00
Copper, heavy and wire	14.00
Copper, light and bottoms	12.00
Brass, heavy	8.75
Brass, light	7.00
Heavy machine composition	14.25
No. 1 yellow rod brass turnings	8.50
No. 1 red brass or composition turnings	11.75
Lead, heavy	4.62 ½
Lead, tea	3.75
Zinc	4.25

